

**OCTOBER 1999
QUARTERLY SAMPLING REPORT AND
1999 ANNUAL GROUNDWATER
MONITORING REPORT
PHIBRO-TECH, INC.**

Santa Fe Springs, California

January 27, 2000

Prepared for:

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February 8, 2000

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Dear Ms. Chou and Messrs. Leach and Kou:

Enclosed are the **Fourth Quarter 1999 Quarterly Groundwater Monitoring Report** and the **1999 Annual Groundwater Monitoring Report** for Phibro-Tech, Inc., Santa Fe Springs facility. The Report includes analytical results and physical measurements obtained October 18-20, 1999 from selected monitoring wells at Phibro-Tech. Since this Report includes portions of the RCRA Facility Investigation (USEPA Docket No. RCRA 09-89-0001), this Report is also submitted to EPA.

Based on a technical review by our consultant, Camp Dresser and McKee, a groundwater monitoring program is included which was implemented beginning with the April 1991 groundwater monitoring. Additional wells and parameters changed at the request of EPA are included in this Groundwater Monitoring Report. The changes are described in the Report. Please contact me if you have any questions or comments concerning this Report.

Very truly yours,

A handwritten signature in black ink, appearing to read "E. E. Vigil". The signature is fluid and cursive, with the first and last names being more prominent.

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Section 1

Introduction

This report summarizes the 54th RCRA quarterly groundwater monitoring sampling and analyses period at the Phibro-Tech, Inc. (PTI), Santa Fe Springs, California facility (formerly referred to as Southern California Chemical). Contained herein are the results of laboratory analyses of groundwater samples and water level measurements obtained during the period of October 26 to October 28, 1999.

The purpose of the groundwater sampling program, which began in March 1985, is to determine if compounds of concern detected in groundwater beneath the site are migrating from the facility. This is accomplished through the comparison of background or up gradient water quality and groundwater quality beneath the site. Statistically-significant increases in contaminant concentrations between known areas of groundwater contamination and downgradient wells would indicate that migration is occurring. In the past, statistical analysis was performed annually and was included in the July quarterly monitoring reports. Statistical analysis is now conducted each quarter and is included in the corresponding monitoring report. The October 1999 statistical analysis is contained in Appendix E of this report.

To date, three types of contaminants have generally been detected in the groundwater beneath the site: soluble metals (primarily chromium and cadmium), purgeable aromatic organic compounds (toluene, ethylbenzene and total xylenes) and purgeable halogenated organic compounds (i.e., solvents, primarily trichloroethene [TCE]). Groundwater modeling completed in January 1993, and groundwater monitoring conducted since 1985, indicate that the purgeable aromatic plume originated up gradient from the PTI facility. The distribution of TCE appears to be ubiquitous, however, somewhat elevated concentrations exist in the vicinity of Pond 1, a RCRA-regulated former surface impoundment area. Elevated concentrations of soluble metals have also been consistently detected in the vicinity of Pond 1. Soluble metal concentrations at the down gradient property line and in deeper wells, however, continue to be negligible to non-detect.

Approximately 15 years of quarterly groundwater monitoring at the PTI facility has indicated a general lack of hexavalent chromium migration. During groundwater modeling performed by CDM in 1993, a retardation factor of 50 was selected based on the observed distribution of hexavalent chromium in the groundwater. Previous data analysis indicated that the most likely basis for the relatively high (but within the range of reasonable and appropriate values) retardation factor would be the existence of reducing conditions in the saturated zone, promoting the conversion of hexavalent chromium to trivalent chromium (Cr^{3+}). Trivalent chromium, having a very low solubility in water, would tend to precipitate and sorb to the soil, limiting migration. During four quarterly sampling events conducted in 1996, additional laboratory analyses (iron and redox potential) were performed on groundwater samples collected from wells MW-04, MW-09, and MW-14S. These additional data, along with the pH, total chromium, and hexavalent chromium data, provided a better understanding of the mechanisms controlling chromium migration in groundwater underlying the facility and supported the above hypothesis. Please refer to Section 6.4 (Chromium Fate and Transport) of the October 1996 Quarterly Sampling Report for a detailed discussion of this conclusion.

In addition to the data obtained during the October 1999 sampling, this report contains tables listing detection limits of the parameters analyzed (Appendix A). Copies of the original laboratory results are included in Appendix B. Chain-of-custody records for the October 1999 sampling are included in Appendix C. Appendix D contains background groundwater concentrations of contaminants for the Santa Fe Springs area for the year 1998. Appendix E contains the complete quarterly statistical analysis.

Prior to October 1993, quarterly reports have included analytical result summary tables from all previous sampling rounds. Starting with the October 1993 quarterly report, historical water quality data tables are no longer included in the report as an appendix. Please refer to Appendix B in the July 1993 Quarterly Sampling Report for a summary of historical groundwater analytical data. A summary table of key historical results since January 1989 is provided in Section 6 (Table 6-1) of this report.

Section 2

Monitoring Well Sampling

Groundwater sampling, utilizing existing on-site monitoring wells, was conducted by CDM personnel during the period of October 26 to October 28, 1999. Field activities were performed in general accordance with the groundwater sampling protocol as outlined in Section 4.3.3 of the approved RCRA Facility Investigation (RFI) Work Plan (CDM, June 1990). Prior to the submittal of the RFI Work Plan for regulatory agency review and approval, the J.H. Kleinfelder and Associates (Kleinfelder) Quality Assurance Project Plan (QAPP, May 1988) was used as the primary groundwater sampling guidance document. Proposed deviations from the RFI Work Plan (i.e., well purging using a submersible pump and sample collection using disposable bailers) were discussed in October 1994 correspondence to the DTSC. These changes were implemented during the October 1994 and all subsequent sampling events.

Twenty-four monitoring wells exist on-site. The locations of these wells are shown on Figure 2-1. One well, MW-06A, historically has not been sampled for groundwater analysis because it is screened in the Gage Aquifer, which is unsaturated below the PTI facility. The remaining wells are screened in the Hollydale Aquifer; 16 in the upper portion and seven in the lower portion of the aquifer.

Beginning in February 1985, Kleinfelder initiated groundwater sampling, utilizing monitoring wells MW-01 through MW-06B. Six additional wells (MW-04A and MW-07 through MW-11) were installed at the site in July 1985, thereby increasing the total number of active wells to 12. Quarterly sampling of the 12 wells was initiated in March 1986.

Commencing with the January 1989 sampling event, CDM has been responsible for all groundwater monitoring activities at the facility. Ten wells (MW-01D, MW-06D, MW-12S, MW-12D, MW-13S, MW-13D, MW-14S, MW-14D, MW-15S and MW-15D) were constructed as part of the first phase of the RFI program and were first sampled during the October 1990 sampling round.

Groundwater analysis of the 22 wells which existed during the RFI program from October 1990 to January 1991, indicated that the number of wells sampled could be reduced and yield comparable results to sampling all the wells. During the April, July, and October 1991, and January 1992 sampling rounds, the 11 wells sampled included 8 wells (MW-01S, MW-03, MW-04, MW-07, MW-09, MW-11, MW-14S, and MW-15S) screened in the upper portion of the Hollydale Aquifer and three wells (MW-01D, MW-04A, and MW-15D) screened in the lower portion of the Hollydale Aquifer.

Beginning with the April 1992 sampling round, three additional wells (MW-06B, MW-06D, and MW-16) were included in the quarterly monitoring program, bringing the total number of sampled wells to 14. A new well, MW-16, constructed in March 1992 as part of the Phase II RFI program, was sampled for the first time during the April 1992 sampling round. The same 14 wells have been sampled during all subsequent sampling rounds. On several occasions, additional laboratory analyses have been performed and additional wells included in quarterly

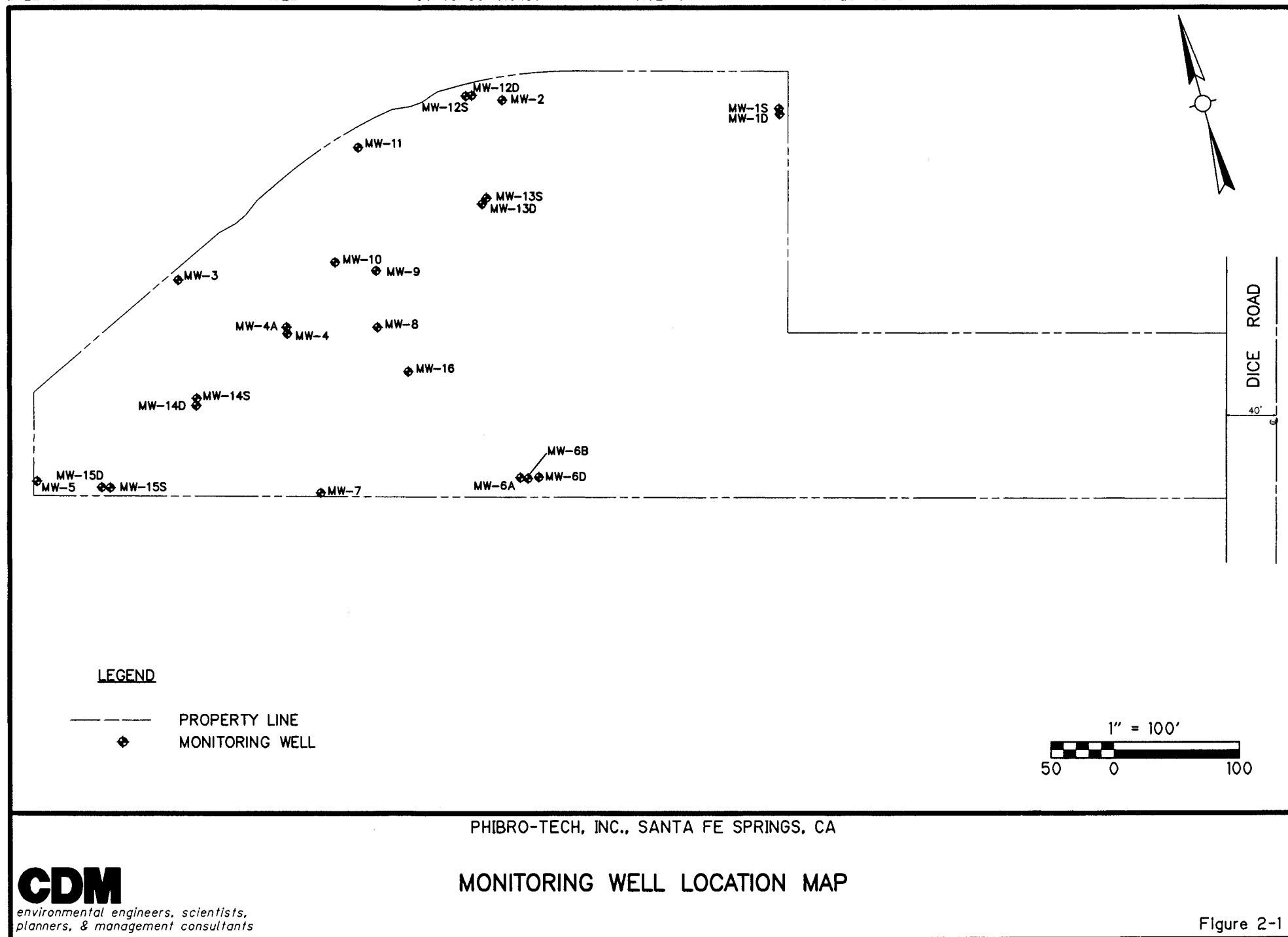


TABLE 2-1
PHIBRO-TECH, INC.
Groundwater Monitoring Program Summary

Sampling Event	Indicator Parameters	Trace Metals	Hexavalent Chromium	Chloride	Nitrate	Volatile Organics	Appendix IX	Comments
3/85	Quad	Cu & Zn	X	X	X	--	--	Sampled wells MW-1, 2, 3, 4, 5, & 6B. Sulfide, nickel, copper and zinc requested by DOHS and RWQCB. Also Appendix III parameters and water quality parameters (see footnote).
7/85	Quad	Cd, Cr	X	--	X	--	--	Sampled wells MW-4A, 7, 8, 10 and 11
3/86	Quad	Cu & Zn	X	X	X	--	--	Sampled 12 wells (MW1, 2, 3, 4, 4A, 5, 6B, 7, 8, 9, 10 & 11). Also Appendix III parameters and water quality parameters (see footnote).
7/86, 9/86, 12/86	Quad	Cd, Cr, Cu, Zn	X	X	X	624	--	Sampled all 12 wells (as previous)
3/87	Quad	Cd, Cr, Cu, Zn	X	X	X	601/602	--	Sampled 11 wells, <u>not 4A</u>
7/87, 10/87, 2/88	Quad	Cd, Cr, Cu, Zn	X	X	X	601/602	--	After July 1987, all 12 wells were sampled during each event
6/88	X (not Quad)	Cd, Cr, Cu, Zn	X	X	X	601/602	--	Performed statistical analysis (t-test) on Indicator Parameters (IPs).
9/88	--	Cd, Cr, Cu, Zn	X	X	X	601/602	--	IPs & volatile organics from MW1, 2, 4A, 5, 6, 7 analyzed semi-annually in June/Dec.
1/89	Quad	Cd, Cr, Cu, Zn	X	X	X	601/602	--	After Jan. 1989, volatile organics analyzed for all 12 wells.
4/89	--	Cd, Cr, Cu, Zn	X	X	X	601/602	--	
7/89	Quad	Cd, Cr, Cu, Zn	X	X	X	601/602	--	Performed statistical analysis of Jan. thru July 1989 data (IPs, total and hexavalent chromium).
10/89	--	Cd, Cr, Cu, Zn	X	X	X	601/602	--	
1/90	Quad	Cd, Cr, Cu, Zn	X	X	X	601/602	--	
4/90	--	Cd, Cr, Cu, Zn	X	X	X	601/602	--	

TABLE 2-1
PHIBRO-TECH, INC.
Groundwater Monitoring Program Summary
(continued)

Sampling Event	Indicator Parameters	Trace Metals	Hexavalent Chromium	Chloride	Nitrate	Volatile Organics	Appendix IX	Comments
7/90	Quad	Cd, Cr, Cu, Zn	X	X	X	601/602	--	Performed statistical analysis of Jan. 1989 data (IPs, total and hexavalent chromium).
10/90	--	Cd, Cr, Cu, Fe, Ni, Pb, Zn	X	X	X	601/602	X	Sampled 22 wells, Appendix IX parameters analyses were performed on wells 4, 4A, 6B, 6D, 12S, 12D, 15S, 15D, plus a duplicate of 4.
1/91	Quad	Cd, Cr, Cu, Fe, Ni, Pb, Zn	X	X	X	601/602	--	Sampled 22 wells.
4/91	pH	Cd, Cr, Cu	X	--	--	601/602	--	New sampling program was initiated. Sampled 11 wells including wells MW-01S, MW-01D, -03, -04, -04A, -07, -09, -11, -14S, -15S, -15D.
7/91	pH	Cd, Cr, Cu	X	--	--	601/602	--	Performed annual statistical analysis.
10/91	pH	Cd, Cr, Cu	X	--	--	601/602	--	Ammonia & TOC analyses added at MW-01S and MW-04.
1/92	pH only (all) TOC only (MW-01 & -04)	Cd, Cr, Cu	X	--	Ammonia as nitrogen (MW-01 & -04)	601/602	--	
4/92	pH only TOC only (MW-01, -04, -09, -14S)	Cd, Cr, Cu-all see comments	X	--	Ammonia as nitrogen (MW-01, -04, -09, -14S)	601/602	EDB (MW-04) TPH (W-16)	Sampled 14 wells including Wells MW-01S, -01D, -03, -04, -04A, -06B, -06D, -07, -09, -11, -14S, -15S, -15D, -16. Additional analysis as part of Phase II RFI; unfiltered metals on MW-04S and -14S. Pb and Ni on wells 1, 4, 14S, 15S, 16; Fe, Zn on well 16.
7/92	pH	Cd, Cr, Cu	X	--	--	601/602	--	Sampled 14 wells. Performed annual statistical analysis.
10/92	pH	Cd, Cr, Cu	X	--	--	601/602	--	Sampled 14 wells.
1/93, 4/93	pH	Cd, Cr, Cu	X	--	--	8010/8020	--	Sampled 14 wells.
7/93	pH	Cd, Cr, Cu	X	--	--	8010/8020 (TVPH, TEPH)	--	Sampled 15 wells. (MW-13S was added) TVPH and TEPH analysis on MW-09, 13S, and 16 only. Performed annual statistical analysis.

TABLE 2-1
PHIBRO-TECH, INC.
Groundwater Monitoring Program Summary
(continued)

Sampling Event	Indicator Parameters	Trace Metals	Hexavalent Chromium	Chloride	Nitrate	Volatile Organics	Appendix IX	Comments
10/93	pH	Cd, Cr, Cu	X	--	--	8010/8020	--	Sampled 15 wells (MW-13S not analyzed for metals and pH) TVPH & TEPH analysis on MW-04, 07, 09, 13S, and 16 only. Performed statistical analysis.
1/94, 4/94	pH	Cd, Cr, Cu	X	--	--	8010/8020	--	Sampled 14 wells Performed statistical analysis.
7/94	pH	Cd, Cr, Cu	X	See comment	--	8010/8020	--	Sampled 14 wells, chloride and sulfate analyses on MW-04, MW-09, MW-14S, MW-15S, MW-15D, and MW-16. Performed statistical analysis
10/94, 1/95, 4/95, 7/95, 10/95	pH	Cd, Cr, Cu	X	--	--	8010/8020	--	Sampled 14 wells Performed statistical analysis.
1/96	pH	Cd, Cr, Cu	X	--	--	8010/8020	--	Sampled 14 wells Performed statistical analysis. 1995 Annual Report included as Appendix F.
4/96, 7/96	pH	Cd, Cr, Cu	X	--	--	8010/8020	--	Sampled 14 wells Performed statistical analysis.
10/96	pH	Cd, Cr, Cu	X	--	--	8010/8020	--	Sampled 14 wells Performed statistical analysis. 1996 Annual Report included as Appendix F.
1/97	pH	Cd, Cr, Cu	X	--	--	8260, MTBE	--	Sampled 14 wells Performed statistical analysis.

TABLE 2-1
PHIBRO-TECH, INC.
Groundwater Monitoring Program Summary
(continued)

Sampling Event	Indicator Parameters	Trace Metals	Hexavalent Chromium	Chloride	Nitrate	Volatile Organics	Appendix IX	Comments
4/97, 7/97	pH	Cd, Cr, Cu	X	--	--	8260	--	Sampled 14 wells Performed statistical analysis.
10/97	pH	Cd, Cr, Cu	X	--	--	8260	--	Sampled 14 wells Performed statistical analysis. 1997 Annual Report included as Appendix F.
1/98	pH	Cd, Cr, Cu	X	--	--	8260	--	Sampled 14 wells Performed statistical analysis. Hexavalent Chromium by Method 7196 in all wells; and by Method 218.6 in wells MW-4A, MW-14S, MW-15S, and MW-15D.
4/98, 7/98	pH	Cd, Cr, Cu	X	--	--	8260	--	Sampled 14 wells Performed statistical analysis.
10/98	pH	Cd, Cr, Cu	X	--	--	8260	--	Sampled 14 wells Performed statistical analysis. 1998 Annual Report included as Appendix F.
1/99, 4/99, 7/99, 10/99	pH	Cd,Cr,Cu	X	--	--	8260	--	Sampled 14 wells Performed statistical analysis.

Appendix III Parameters - As, Ba, Cd, Cr, F, Pb, Hg, N, Se, Ag, Endrin, Lindane, Methoxychlor, Toxaphene, 2,4-D, 2,4,5-TP (Silvex), Radium, Gross Alpha & Beta, Turbidity, coliform bacteria.
Water Quality Parameters - Cl, Fe, Mn, Phenols, Na, SO₄
Indicator Parameters (IP) - TOX, TOC, pH, EC (quadruplicate)
624 - Volatile organics analysis
601/602 - Purgeable halocarbons/aromatics analysis
8010/8020 - Purgeable halocarbons/aromatic analysis
8260 - Purgeable halocarbons/aromatic analysis
MTBE - Methyl tertiary butyl ether
Appendix IX Parameters - See Appendix F in the October 1990 Quarterly Sampling Report for a complete listing of parameters.

sampling, at the request of the U.S. EPA. Additional analyses and wells are noted in the comments column of Table 2-1, which summarizes the groundwater monitoring program at the site.

The 14 wells currently included in quarterly sampling are MW-01S, MW-01D, MW-03, MW-04, MW-04A, MW-06B, MW-06D, MW-07, MW-09, MW-11, MW-14S, MW-15S, MW-15D, and MW-16. Ten shallow and four deep wells are analyzed for pH, metals (cadmium, chromium, and copper using EPA Method 6010A; and hexavalent chromium using EPA Method 7196), and purgeable halogenated/aromatic organic compounds (EPA Method 8260). A detailed listing of analytical parameters per sampling event is provided in Table 2-1.

Beginning with the July 1993 sampling event, the 14 wells have generally been purged and sampled in the following order: MW-01, MW-01D, MW-03, MW-11, MW-06B, MW-06D, MW-07, MW-04A, MW-04, MW-14S, MW-15S, MW-15D, MW-16, and MW-09.

2.1 Sampling Procedure

Field sampling was conducted in general accordance with procedures detailed in the RFI Work Plan. Sampling practices included efforts to detect floating product and hydrocarbon vapors at each well, measurement of the static water level and total depth of each well for calculating pre-sampling evacuation volumes, purging and sampling of groundwater for laboratory analysis, decontamination of sampling equipment, and handling of sample-filled containers in accordance with Section 4.3.3.5 of the RFI Work Plan. In general, these procedures were consistent with previous quarterly sampling by Kleinfelder. Details of previous procedures have been discussed in prior Quarterly Sampling Reports.

2.1.1 Organic Vapor Check

Standard field procedures include checking the interior of each well with a photoionization detector (PID) (equipped with a 10.0 eV lamp) for the presence of organic vapors whenever the well casing is opened. With the sampling team members standing upwind of the well, the well cap was opened slightly, allowing for the insertion of the PID probe tip inside the well. Readings were monitored until they stabilized, which was usually at zero parts per million (ppm). The final reading, as well as the peak reading, were recorded in the field log book. The cap was then removed and the well allowed to vent for a short period of time prior to measuring the static water level. The maximum PID readings taken during the collection of water level measurements are shown in Table 5-1 in Section 5.

2.1.2 Detection of Immiscible Layers

In order to detect the presence of floating, immiscible layers on top of the groundwater surface, a clear bailer was lowered approximately one-half the length of the bailer below the surface of the water in each well. The bailer was removed from the well and its contents checked for immiscible layers or iridescence. The bailer was decontaminated and the sampling line discarded after each use. If immiscible fluids had been detected, a sample would have been collected for laboratory analysis of purgeable halocarbons and aromatics (EPA Method 8260) and total petroleum hydrocarbons (California Department of Health Services [CA DHS] Method) using a new bailer. As in all previous quarterly groundwater sampling at the PTI facility by CDM, immiscible layers were not detected during the October 1999 sampling event.

2.1.3 Static Water Level/Well Depth Measurement

On October 26, 1999, prior to the initiation of on-site well pumping, the static water level at 22 of the 24 on-site wells was measured three times at each well location with a decontaminated electric water level indicator (sounder) and recorded. The measurements collected in the wells were identical, therefore, there was no need to collect additional measurements or average the data of these wells. The results of these measurements are shown in Table 5-1 and discussed in Section 5. One well (MW-06A) was dry, and MW-02 was not measured due to its proximity to MW-12S.

The water level in each well was also measured immediately prior to initiating well evacuation procedures for calculation of well purge volume. During measurement, the measuring (reference) point used was noted (i.e., the top of the steel casing), and the depth to water below the reference point was measured to the nearest 0.01 foot and recorded in the field log book. Well head elevation data was used with depth to water measurements to calculate groundwater elevation at each well location.

The bottom of each well sampled was also measured with the sounder to the nearest 0.1 foot. The amount of fill material in the bottom of the well was calculated from well construction data and noted in the log book. Prior to first use, the sounder was calibrated and the meter response checked. The sounder probe and line were decontaminated after each use.

2.1.4 Purge Volume Determination/Well Evacuation

Saturated casing volume was calculated at each well by using the depth to water and bottom sounding measurements obtained immediately prior to purging, to calculate the amount (height) of the saturated well casing. The inside diameter of the casing was then measured, and the following formula applied:

$$\text{Volume} = \pi \text{ radius}^2 \times \text{height}$$

A minimum of three saturated casing volumes of water were evacuated from each well prior to collecting a groundwater sample for laboratory analysis.

During the October 1999 sampling round, all 14 of the wells currently monitored were purged using a Grundfos 2-inch diameter submersible pump, and each well was sampled using a new disposable bailer.

For measurement of field parameters during well evacuation, a LeMotte Model 2020 turbidity meter, an Orion 250A pH meter, and a YSI Model 33 electrical conductivity (EC)/temperature meter were used. The instruments were calibrated or field checked prior to use with standard solutions in accordance with manufacturer's directions. The meters are used to determine the stability of discharge water field parameters prior to collection of a sample for laboratory analysis.

Periodically during well evacuation, the field parameters of the discharge water were measured and recorded in the log book. The physical appearance of the water (turbidity, color, sediment content, etc.) was also noted and recorded. Initial field turbidity measurements generally

ranged from 1.1 to 190 NTUs (nephelometric turbidity units) at the start of well evacuation. At the end of well evacuation, measurements were generally less than 10 NTUs. Higher turbidity at the start of purging seems to be related to agitating the water column and resuspending material from the bottom of the well during pump installation. After a minimum of three saturated casing volumes of water were evacuated from each well and the field parameters stabilized (change between readings of less than 5 to 10 percent), a sample for laboratory analysis was collected.

All purge water collected from each well was discharged directly into 55-gallon barrels for treatment by PTI in the facility's wastewater treatment system.

2.1.5 Sample Collection and Handling

Groundwater samples were collected with a new disposable bailer from the approximate middle of the perforated section, and poured directly into previously-labeled sample bottles. During sample collection, the bailer was carefully and gently lowered past the air/water interface to minimize agitation and aeration of water during sample collection. The sample bottles were placed inside plastic zip-lock bags and then placed immediately into an ice-cooled chest. Prior to shipment, the bottles were cushioned with bubble wrap or plastic bags to avoid breakage. Samples collected for total metals analysis were field filtered using a 0.45 micron filter. A volume of groundwater equal to two times the capacity of the filtering device was passed through the filter and discarded prior to filtering each sample for metals (Cd, Cu and Cr) analysis. Filters were discarded after each use.

The October 1999 groundwater samples were collected for laboratory analysis of the following parameters:

- Halogenated/Aromatic Volatile Organic Compounds by EPA method 8260
- Metals (Cd, Cu, and Cr)
- Hexavalent Chromium (Cr⁺⁶)
- pH

Groundwater sample bottles were numbered using the following format:
PTI-MW01S-045

Where:

- | | | |
|-------|---|--|
| PTI | - | designates site acronym |
| MW01S | - | designates sample location number (MW = Monitoring Well) |
| EB | - | designates equipment blank sample |
| TB | - | designates travel blank sample |
| 045 | - | designates sequential sample number (per sampling event) |

This was the 44th round of sampling conducted by CDM, however, due to a previous labeling inconsistency, a 045 sequence number was assigned to all groundwater samples collected during this round. Sample label information included date and time of sampling, CDM sample number, and analytical parameters.

All filled sample containers that were collected from each well were accompanied by chain-of-custody forms that indicated the label information as well as the responsible person during each step of the transportation process. All samples were sent by courier to Quanterra Laboratories in Santa Ana, California on the day that they were collected, and a copy of the chain-of-custody form for that day was retained by CDM field personnel. Copies of completed chain-of-custody forms are included in Appendix C. The laboratory was notified at the time of delivery that one or more hexavalent chromium (Cr⁶⁺) sample(s) were contained in the shipment to ensure that the samples would be analyzed within the prescribed 24-hour holding period.

2.2 Equipment Decontamination Procedures

The following sections describe the procedures utilized to decontaminate groundwater sampling equipment.

2.2.1 Sampling Pump/Lines Decontamination

The submersible pump and discharge tubing used for well purging were decontaminated to reduce the possibility of cross-contamination between monitoring wells. The first step in the decontamination procedure was to submerge the pump into a decontaminated 5-gallon bucket containing a soap (Alconox, a laboratory-grade detergent) and water mixture, and pump at least five gallons of the solution through the system. The pump assembly was then submerged in another 5-gallon bucket filled with tap water and at least 10 gallons were pumped through the system. The final decontamination step was accomplished by submerging the pump into a decontaminated 5-gallon bucket containing deionized (DI) water and pumping approximately five gallons of DI water through the system.

The exterior of the pump and discharge tubing was steam cleaned, as well as the exterior of the reel holding the tubing. The decontamination of the exterior pump line was performed over a plastic waterproof tarp. The tarp was placed on a gently sloping surface and bermed up at the edges, allowing the decontamination water to flow away from the equipment being cleaned. The spent water was recovered and stored in 55-gallon drums for treatment by PTI in the facility's wastewater treatment system.

2.2.2 Accessory Sampling Equipment Decontamination

Accessory sampling equipment such as the metals filter apparatus, bailer, and water level sounder were also decontaminated to minimize the possibility of cross-contamination between the monitoring wells. The filter apparatus, bailer, and sounder were decontaminated first by washing in a bucket of soap and water, followed by a tap water rinse, followed by a final DI water rinse. Bailers used to test for an immiscible layer were decontaminated and reused. The bailers and nylon rope that were used to sample wells were discarded immediately after use.

Section 3

Laboratory Testing

Analytical and duplicate testing of groundwater samples collected during the October 1999 monitoring event was provided by Quanterra Laboratories of Santa Ana, California. During the October 1999 quarterly sampling event, a total of 20 water samples were submitted for laboratory analysis. Fourteen monitoring well samples and two blind duplicate samples from MW-04 and MW-09 were collected and submitted to Quanterra for analysis of purgeable halocarbons/aromatics (EPA Method 8260), cadmium, total and hexavalent chromium, copper, and pH. In addition, two equipment blank samples were submitted for analysis of the above parameters. Two travel blanks (TB) were also submitted to Quanterra for analysis of purgeable halogenated/aromatic organics.

The October 1999 groundwater analytical results are discussed in Section 6 and summarized in Tables 6-1 through 6-4. Quality assurance analytical results (duplicates, equipment blanks, and travel blanks) are discussed in Section 4.0 and summarized in Tables 4-1 through 4-4. Individual analytical reports for October 1999 are contained in Appendix B.

Section 4

Quality Assurance

To verify the accuracy and validity of analytical data, certain quality assurance procedures were implemented. The field and laboratory quality assurance results were checked for deviations from the Quality Assurance (QA) guidelines discussed in the RFI Work Plan.

4.1 Field Quality Assurance

The field QA procedures included the use of duplicate samples, equipment blanks, travel blanks, and the use of chain-of-custody forms. The results of the QA analyses have been compiled by type of parameter: purgeable halogenated organics, purgeable aromatic organics, and inorganics, in Tables 4-1 through 4-3, respectively. Table 4-4 lists quality assurance results which are outside the ranges specified in the RFI Work Plan. Detection limits of parameters analyzed are shown in the analytical reports contained in Appendix B.

4.1.1 Duplicate Samples

Standard accepted practice is to submit one duplicate sample for analysis for approximately every tenth sample collected, a ratio of 1 to 10. During the October 1999 round of sampling, duplicate samples were collected from monitoring wells MW-04 and MW-09. The duplicate samples were submitted to the analytical laboratory as blind samples, and were designated MW-35 and MW-37, respectively, on the chain of custody forms. Monitoring wells MW-04 and MW-09 were selected due to elevated concentrations of certain contaminants detected during previous sampling rounds. Analytical results for the duplicate samples for October 1999 are shown in Tables 4-1, 4-2, and 4-3.

Duplicate results which deviate greater than 20% from the original results are shown in Table 4-4. No deviation greater than 20% was found in any of the duplicate samples.

4.1.2 Equipment Blanks

Analytical results for the equipment blanks collected during October 1999 are shown in Tables 4-1, 4-2 and 4-3.

Equipment blank EB-01 was obtained by allowing deionized water to run through a new, precleaned, disposable bailer. The other equipment blank (EB-02) was obtained by pouring deionized water over the submersible pump after decontamination. The samples were collected in the appropriate containers and submitted for laboratory analysis. Sample EB-01 was collected to evaluate the effectiveness of the factory cleaning process. Sample EB-02 was collected following pump decontamination after sampling well MW-16. The equipment blanks were submitted to the laboratory for analysis of purgeable halogenated/aromatic volatile compounds (EPA Method 8260), cadmium, chromium (total and hexavalent), copper, and pH. The analytical results did not indicate any detections above the method detection limits in either equipment blank.

4.1.3 Travel Blanks

The detection of compounds in travel blanks is generally indicative of systematic contamination from sample transport, laboratory glassware cleaning, laboratory storage, or analytical procedures. During the October 1999 sampling event, two laboratory-prepared travel blanks (TB01 and TB02) consisting of organic-free water were labeled and submitted to the lab for purgeable halocarbon and aromatic volatile organic analysis by EPA Method 8260. Each travel blank was stored with the day's samples, to be analyzed for volatile organic compounds.

Tables 4-1 and 4-2 show the results of the travel blank analyses. No compounds were detected above the method detection limit in either of the two travel blanks.

4.1.4 Sample Control

All sample containers were labeled immediately prior to sampling with the sample identification information completed with a waterproof pen. Samples were transported under chain-of-custody and hand delivered by courier to the laboratory in ice-cooled chests. Copies of the chain-of-custody records are included in Appendix C.

4.2 Laboratory Quality Assurance

General QA procedures for Quanterra Laboratory, which performed laboratory analysis on all monitor well and quality assurance samples, are discussed in the RFI report. Quanterra provides internal laboratory QA/QC results with each sample analytical report. Matrix spike, matrix spike duplicate, method blank, and duplicate control sample results are noted in the QA/QC reports. In addition, surrogate recoveries are also noted for volatile organics analyses. The laboratory QA/QC results were within acceptable limits for the October 1999 sampling. The laboratory control sample results were also within acceptable limits.

TABLE 4-1
PHIBRO-TECH, INC.
October 1999 Quarterly Monitoring Well Sampling
Quality Assurance Samples
Purgeable Halogenated Organic Analytical Results
(ug/L)

Sample Identification	Tetrachloro-ethene (PCE)	Trichloro-ethene (TOE)	1,1-Dichloro-ethene (1,1-DCE)	1,1-Dichloro-ethane (1,1-DCA)	1,2-Dichloro-ethane (1,2-DCA)	Chloroform (CHCL3)	cis-1,2-Dichloro-ethene (cis-1,2-DCE)	1,1,1-Trichloro-ethane (1,1,1-TCA)	Methylene chloride (CH2CL2)
PTI-EB01	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI-EB02	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI-MW04	ND <5.0	210	82	170	85	25	160	ND <5.0	130
PTI-MW04-DUP	ND <5.0	220	88	190	74	30	170	ND <5.0	150
PTI-MW09	ND <5.0	280	86	160	85	92	7.4	ND <5.0	250
PTI-MW09-DUP	ND <5.0	290	92	180	88	94	8.0	ND <5.0	250
PTI-TB01	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI-TB02	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0

All analyses performed by EPA Method 8260.

ND = Analytical parameter not detected

MW = Monitoring Well

MW-DUP = Monitoring Well - Duplicate

EB01 = Equipment Blank collected from a new disposable bailer.

EB02 = Equipment Blank collected from the submersible pump.

TB = Travel Blank

TABLE 4-2
 PHIBRO-TECH, INC.
 October 1999 Quarterly Monitoring Well Sampling
 Quality Assurance Samples
 Purgeable Aromatic Organic Analytical Results
 (µg/L)

Sample Identification	Benzene	Toluene	Ethyl-benzene	Xylenes (Total)
PTI-EB01	ND <1.0	ND <1.0	ND <1.0	ND <2.0
PTI-EB02	ND <1.0	ND <1.0	ND <1.0	ND <2.0
PTI-MW04	ND<5.0	ND<5.0	92	11
PTI-MW04-DUP	ND<5.0	ND<5.0	80	13
PTI-MW09	ND<5.0	ND<5.0	ND<5.0	ND<10
PTI-MW09-DUP	ND<5.0	ND<5.0	ND<5.0	ND<10
PTI-TB01	ND <1.0	ND <1.0	ND <1.0	ND <2.0
PTI-TB02	ND <1.0	ND <1.0	ND <1.0	ND <2.0

All analyses performed by EPA Method 8260.

ND = Analytical parameter not detected.

NA = Parameter not analyzed.

MW = Monitoring Well

MW-DUP = Monitoring Well - Duplicate

EB01 = Equipment Blank collected from a new disposable bailer.

EB02 = Equipment Blank collected from the submersible pump.

TB = Travel Blank

TABLE 4-3
PHIBRO-TECH, INC.
October 1999 Quarterly Monitoring Well Sampling
Quality Assurance Samples
Inorganic Analytical Results
(mg/L)

Well Identification	Cadmium EPA- 6010B	Chromium (Hexavalent) EPA- 7196A	Chromium (Total) EPA-6010B	Copper EPA-6010B	pH EPA-150.1
PTI-EB01	ND <0.0050	ND <0.010	ND <0.010	ND < 0.025	6.1
PTI-EB02	ND <0.0050	ND <0.010	ND <0.010	ND < 0.025	6.6
PTI-MW04	0.59	58.2	105	ND <0.075	6.5
PTI-MW04-DUP	0.58	60.5	102	ND < 0.025	6.6
PTI-MW09	ND <0.0050	4.0	4.2	ND < 0.025	6.9
PTI-MW09-DUP	ND <0.0050	3.6	4.2	ND < 0.025	6.4

ND = Analytical parameter not detected.

NA = Parameter not analyzed.

MW = Monitoring Well

MW-DUP = Monitoring Well - Duplicate

EB01 = Equipment Blank collected from a new disposable bailer.

EB02 = Equipment Blank collected from the submersible pump.

TABLE 4-4
 PHIBRO-TECH, INC.
 October 1999 Quarterly Monitoring Well Sampling
 Quality Assurance Deviations

Quality Assurance Criteria	Cadmium (mg/l)	Chromium, Hexavalent (mg/l)	Chromium, Total (mg/l)	Copper (mg/l)	Benzene (ug/l)	Toluene (ug/L)	Ethyl- Benzene (ug/l)	Xylenes, Total (ug/l)	Halogenated Volatile Organic Compounds (ug/l)
Equipment Blanks									
PTI-EB01- 045									
PTI-EB02- 045									
Travel Blanks									
PTI-TB01- 045									
PTI-TB02- 045									
PTI-TB03- 045									
Laboratory Blanks									
Method Blank									
Duplicate Deviation (>20%)									
PTI-MW04- 045									
PTI-MW09- 045									
Holding Time Exceedance									

EB01 = Equipment Blank collected from a new disposable bailer.

EB02 = Equipment Blank collected from the submersible pump.

TB = Travel Blank

Section 5

Groundwater Elevation

On October 22, 1999, prior to the initiation of well evacuation procedures, the depth to groundwater was measured in 22 of the 24 on-site monitoring wells. Groundwater elevations were calculated by subtracting the depth to static water level from the surveyed elevation of the corresponding monitoring well.

All of the monitoring well casing elevations were surveyed during the RFI and three wells (MW-04, MW-09, and MW-10) were resurveyed in January 1996 following wellhead repair. In July 1998, wellhead repairs were performed on wells MW-03, MW-06A, MW-06B, MW-06D, MW-08, MW-11, MW-12S, MW-12D, MW-13S, MW-13D, and MW-16. These wells were resurveyed during the July 1998 monitoring event.

During the October 1999 groundwater sampling round, water level measurements were taken at shallow wells MW-01S, MW-03, MW-04, MW-05, MW-06B, MW-07, MW-08, MW-09, MW-10, MW-11, MW-12S, MW-13S, MW-14S, MW-15S, and MW-16. Water level measurements were also taken at deep wells MW-01D, MW-04A, MW-06D, MW-12D, MW-13D, MW-14D, and MW-15D. These wells were measured in order to evaluate the direction and gradient of groundwater flow underlying the facility and to help characterize the shallow and deep aquifer interaction. Well MW-02 was not measured due to its proximity to MW-12S. Well MW-06A was measured and found to be dry.

Table 5-1 lists the depths to water and groundwater elevations for each well sampled. Figure 5-1 shows the approximate groundwater surface elevation of the upper Hollydale Aquifer for wells screened in the shallow interval (45 to 77 feet below ground surface) using data collected during the October 1999 sampling round. The contours shown in Figures 5-1 and 5-2 were generated by D.C.A., a surface contouring software developed by Softdisk, which is commonly used in conjunction with CADD (Computer Aided Drafting and Design) to produce contour maps and other graphics.

The direction of groundwater flow as observed in the shallow monitoring wells is approximately S 76° W at an average gradient of 0.33 feet per 100 feet in the western portion of the facility, where the majority of the monitoring wells are located. The gradient in the shallow wells is comparable to the July 1999 gradient of 0.32 feet per 100 feet. The flow direction has an increased westward component from that obtained in July 1999 (S 45° W).

Figure 5-2 shows the approximate groundwater elevation of the lower Hollydale Aquifer for wells screened in the deeper interval (78.3 to 123.5 feet below ground surface). Groundwater contours for the deeper wells follow the same general trend as those of the shallow wells. The direction of groundwater flow is approximately S 78° W at an average gradient of 0.42 feet per 100 feet. The gradient in the deep wells has increased compared to the July 1999 gradient of 0.31 feet per 100 feet, and the flow direction has increased westward component from that obtained in July 1999 (S 48° W).

TABLE 5-1
PHIBRO-TECH, INC.
October 1999 Quarterly Monitoring Well Sampling
Groundwater Elevation Data

Well No.	Well Headspace* (ppm)	Total Depth Constructed (ft)	Total Depth Measured (ft)	Perforated Intervals (ft)	Calculated Casing Fill (ft)	M.P. Elevation (ft)	Depth to Water (ft below MP)	G.W. Elevation (ft above MSL)
1S	0.0 / 0.0	62.5	62.1	47-62.5	0.4	152.63	45.93	106.70
1D	0.0 / 0.0	94.8	95.7	79.5-94.5	0.0	152.60	46.05	106.55
3	3.3 / 0.0	74.1	73.3	45-75	0.8	154.75	50.33	104.42
4	0.0 / 0.0	67.5	67.8	45-75	0.0	152.37	47.88	104.49
4A	0.0 / 0.0	107.0	106.6	87-107	0.4	152.46	47.82	104.64
5	0.0 / 0.0	75.0	---	45-75	---	153.26	49.31	103.95
6A	13.3 / 0.0	---	---	10-30	---	---	DRY	---
6B	0.0 / 0.0	77.6	77.0	45-75	0.6	149.53	44.49	105.04
6D	0.0 / 0.0	95.5	93.4	79-94	2.1	150.13	45.03	105.10
7	13.2 / 0.0	71.5	71.5	45-75	0.0	149.42	44.92	104.50
8	20.1 / 0.0	71.0	---	41-71	---	150.17	45.29	104.88
9	0.0 / 0.0	73.5	73.5	44-77	0.0	152.96	48.05	104.91
10	16.7 / 0.0	75.0	---	45-75	---	153.89	49.01	104.88
11	3.8 / 0.0	75.5	74.2	55-75	1.3	155.76	50.71	105.05
12S	31 / 0.0	72.0	---	51-72	---	155.79	50.27	105.52
12D	0.0 / 0.0	101.0	---	84.5-100	---	155.72	50.32	105.40
13S	13.6 / 0.0	70.3	---	50.3-70.3	---	151.72	46.37	105.35
13D	3.0 / 0.0	93.3	---	78.3-93.3	---	151.68	46.38	105.30
14S	53.0 / 0.0	71.5	70.8	46-72	0.7	150.50	46.19	104.31
14D	0.0 / 0.0	109.0	---	88-103	---	150.56	46.21	104.35
15S	0.0 / 0.0	71.5	71.4	51.5-71.5	0.1	151.01	46.94	104.07
15D	0.0 / 0.0	123.8	124.0	108.5-123.5	0.0	150.96	47.08	103.88
16	35.7 / 0.0	62.5	62.0	42-62	0.5	150.27	45.46	104.81

M.P. = Measuring point (top of steel casing)

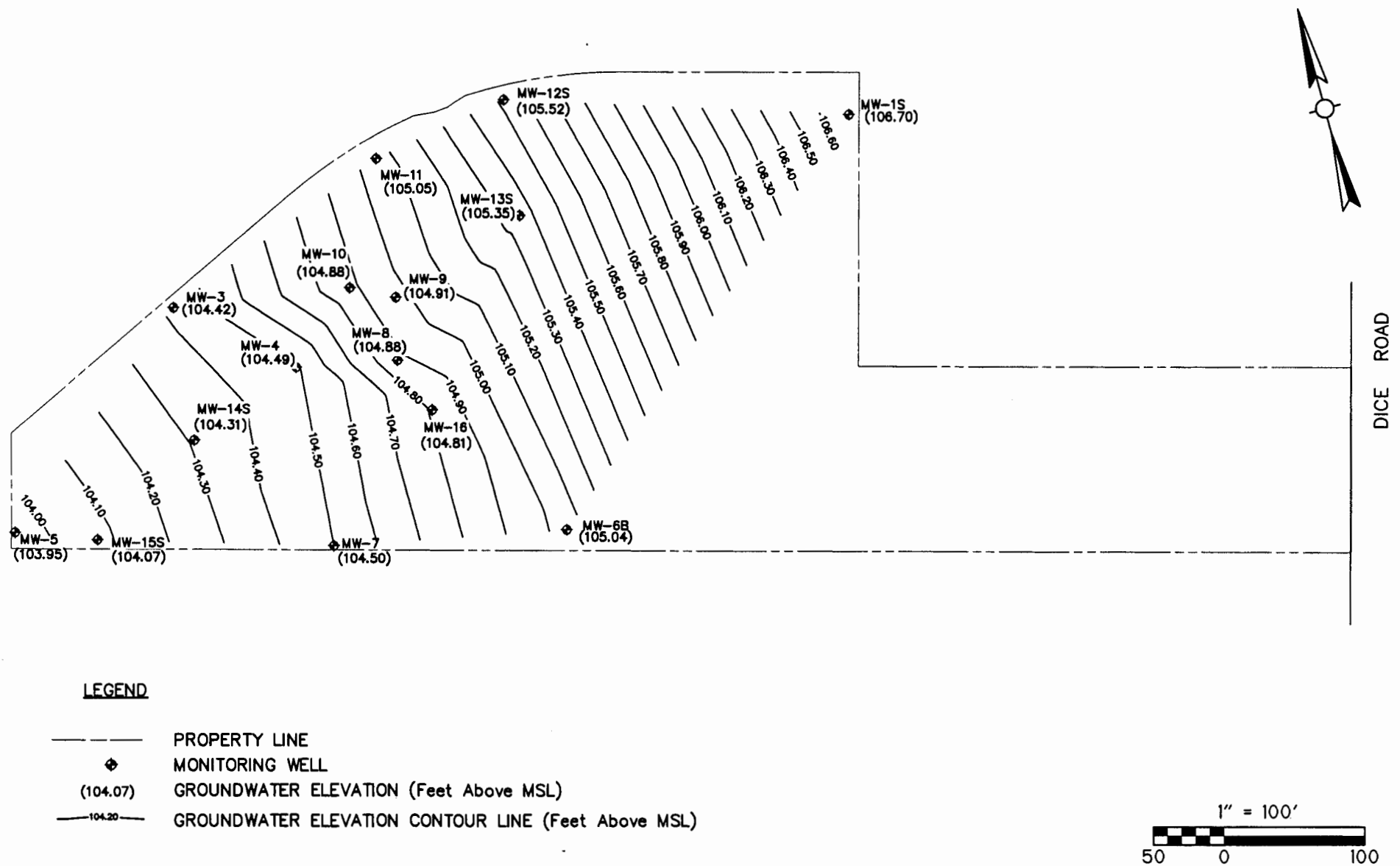
G.W. = Groundwater

--- = Not measured or not calculated.

MSL = mean sea level

* = Measured with PID prior to sampling (casing/background)

Note: Depth to water measurements collected on October 22, 1999 prior to purging/sampling on-site wells.



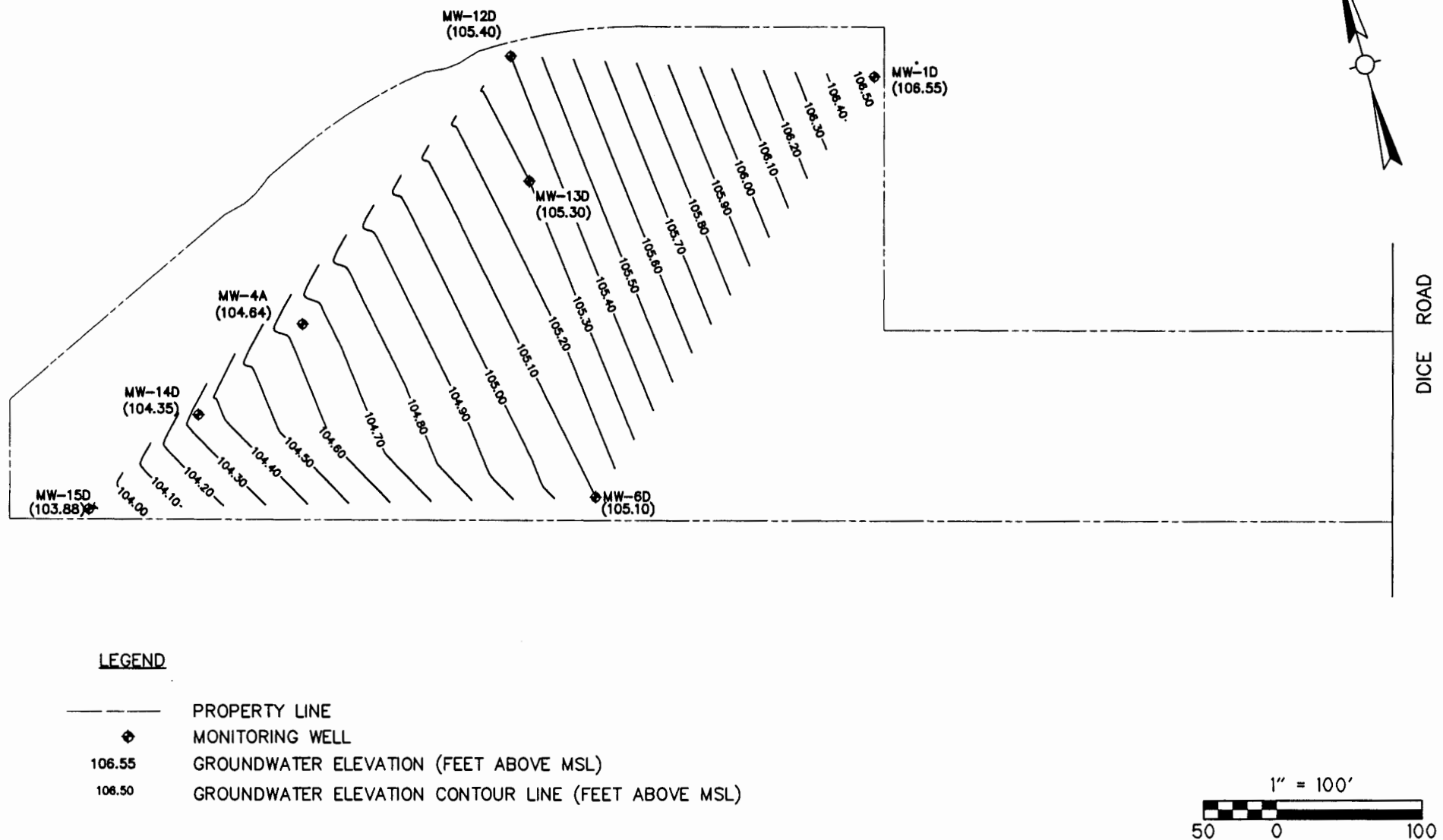
PHIBRO-TECH, INC., SANTA FE SPRINGS, CA

Groundwater Elevation Contours - Shallow Wells

October 1999

CDM

environmental engineers, scientists,
planners, & management consultants



PHIBRO-TECH, INC., SANTA FE SPRINGS, CA

Groundwater Elevation Contours - Deep Wells

October 1999

CDM

environmental engineers, scientists,
planners, & management consultants

With the 22 wells measured for water levels during the October 1999 sampling round, there were seven locations where a deep well was measured adjacent to a shallow well. Shallow wells are screened within the interval of 45 to 77 feet. Deep wells are screened within the interval of 78.3 to 107 feet, with the exception of MW-15D which is screened from 108.5 to 123.5 feet. Of the well pairs, groundwater elevations at deep wells MW-1D, MW-12D, MW-13D and MW-15D were slightly lower (0.15 feet, 0.12 feet, 0.05 feet, and 0.19 feet respectively) than the corresponding shallow well elevations. The groundwater elevations at deep wells MW-4A, MW-6D, and MW-14D were slightly higher (0.15 feet, 0.06 feet, and 0.04 feet, respectively) than the corresponding shallow well elevations. Based on these and past groundwater elevation comparisons among shallow and deep well pairs, it does not appear that a well-defined vertical gradient between shallow and deep intervals exists.

Average groundwater elevations during the October 1999 sampling event decreased from the previous quarter. Water level decreases ranged from a minimum of 6.92 feet at well MW-15 to a maximum of 9.25 feet at well MW-3.

Section 6

Groundwater Quality

In order to compare the analytical data from the previous sampling events (1989 through July 1999 quarterly events) with the October 1999 data, Table 6-1 was compiled. This table compares groundwater analytical parameters (hexavalent and total chromium, cadmium, copper, purgeable aromatics and trichloroethene), and groundwater elevations at shallow well locations which were sampled during October 1999. Laboratory analytical reports from all wells sampled during the October 1999 sampling round are located in Appendix B.

Consistent with the results of laboratory testing performed on the groundwater samples collected since January 1989 from the on-site monitoring wells, three contaminant plumes in the Hollydale Aquifer were identified. Historically, these plumes have been present at varying concentrations and lateral extent. One small plume, consisting primarily of site-specific metals parameters, has been aligned in a northeasterly to southwesterly direction in the vicinity of wells MW-04 and MW-14S. The second, consisting of purgeable aromatics, has also been aligned in a northeasterly to southwesterly direction with the highest concentrations generally found in wells MW-04 and MW-09. The third plume consists of trichloroethene and related parameters with highest concentrations generally detected in wells MW-04, MW-09, MW-11, and MW-14S.

6.1 Purgeable Halogenated Organic Compounds

Table 6-2 shows the analytical results for purgeable halogenated organic compounds in deep and shallow wells during October 1999. Trichloroethene was the primary compound detected, with miscellaneous other halogenated organics also detected. The table also shows, for comparison purposes, maximum contaminant limits (MCLs) and concentrations for water supply wells in the Santa Fe Springs area. The supply wells, however, are likely screened much deeper than the wells at PTI. The City of Santa Fe Springs Annual Water Quality Report for 1998 (the most recent report available) is contained in Appendix D of this document.

Trichloroethene

Trichloroethene (TCE) was detected in all 14 of the groundwater monitoring wells sampled during October 1999. The highest concentration of TCE detected in October 1999 was 650 µg/L in well MW-11, a decrease from the result of 740 µg/L in July 1999. The second highest concentration of TCE detected was 280 µg/L in well MW-09, a decrease from the result of 810 µg/L in July 1999. The third highest concentration of TCE detected was 210 µg/L in well MW-04, a decrease from the result of 140 µg/L in July 1999.

Detected concentrations of TCE in the majority of the remaining shallow wells increased slightly in October 1999 from the results in July 1999, and ranged in concentration from 6.7 µg/L in MW-15S to 180 µg/L in MW-14S. Deep well detections decreased in all four wells (MW-01D, MW-06D, MW-04A, MW-15D). TCE concentrations in the deep wells ranged from

TABLE 6-1
PHIBRO-TECH, INC.
October 1999 Quarterly Monitoring
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS				PURGEABLE				Trichloroethene (ug/L)
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl- Benzene (ug/L)	Total Xylenes (ug/L)	
MW - 1S										
Jan-89	96.74	ND < 0.01	0.014	ND < 0.003	ND < 0.009	ND < 0.01	ND < 0.0	ND < 0.0	ND < 0.0	19
Apr-89	100.45	ND < 0.05	0.1	ND < 0.01	ND < 0.02	ND < 0.7	ND < 1.0	ND < 1.0	ND < 1.0	23
Jul-89	99.00	ND < 0.05	0.06	0.01	0.03	ND < 0.7	ND < 1.0	ND < 1.0	ND < 1.0	13
Oct-89	96.76	ND < 0.05	ND < 0.02	ND < 0.01	ND < 0.05	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	12
Jan-90	97.73	ND < 0.02	ND < 0.01	ND < 0.01	ND < 0.02	ND < 0.5	ND < 0.5	ND < 0.5	ND < 1.0	16
Apr-90	99.30	ND < 0.02	0.02	ND < 0.0050	0.02	ND < 2.5	ND < 2.5	ND < 2.5	ND < 5.0	20
Jul-90	100.83	ND < 0.02	ND < 0.01	ND < 0.01	0.03	ND < 0.5	ND < 0.5	ND < 0.5	ND < 1.0	18
Oct-90	99.81	ND < 0.02	ND < 0.01	ND < 0.0050	0.023	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	18
Jan-91	99.19	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	26
Apr-91	101.95	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	22
Jul-91	102.94	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	17
Oct-91	102.33	ND < 0.02	0.01	ND < 0.0050	0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	14
Jan-92	104.60	0.10	0.0081	ND < 0.0027	0.04	ND < 1	1.5	1.2	4.3	13
Apr-92	107.28	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 0.5	ND < 0.5	ND < 0.5	9.9
Jul-92	107.87	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	10
Oct-92	105.53	ND < 0.02	ND < 0.01	ND < 0.0050	0.035	0.95	ND < 1.0	ND < 1.0	ND < 1.0	11
Jan-93	109.82	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	2.2	1.3	5.6	9.2
Apr-93	116.01	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	5.7
Jul-93	116.59	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	1.7	1.7	4.0	11
Oct-93	116.50	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	2.2	4.3	14
Jan-94	116.60	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	9.3
Apr-94	117.10	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	14
Jul-94	117.80	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	7.9
Oct-94	112.23	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	5.8
Jan-95	113.59	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	5.2
Apr-95	118.78	ND < 0.02	0.0029	ND < 0.01	ND < 0.02	ND < 0.5	ND < 1.0	1.3	1.0	4.4
Jul-95	120.06	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	1.2	3.5	6.1	6.2
Oct-95	116.48	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	1.7	3.9	15
Jan-96	114.84	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	1.7	5.1	8.4
Apr-96	118.03	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	3.4	4.9	2.9
Jul-96	117.42	ND < 0.01	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	2.2	3.7	9.7
Oct-96	113.85	ND < 0.01	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	2.1	2.8	16
Jan-97	115.73	ND < 0.02	ND < 0.01	ND < 0.0050	0.022	ND < 0.5	ND < 1.0	ND < 1.0	2.0	6.0
Apr-97	118.21	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	1.4	1.2	15
Jul-97	118.18	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	14
Oct-97	114.82	ND < 0.02	ND < 0.01	ND < 0.0050	0.023	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	12
Jan-98	113.23	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	12
Apr-98	118.16	ND < 0.02	ND < 0.01	ND < 0.0050	0.021	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	14
Jul-98	119.12	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	14
Oct-98	116.57	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	7.8
Jan-99	113.94	ND < 0.01	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	2.0	ND < 1.0	10
Apr-99	114.01	ND < 0.025	ND < 0.01	ND < 0.0050	ND < 0.025	ND < 1.0	ND < 1.0	ND < 1.0	ND < 2.0	7.2
Jul-99	113.62	ND < 0.020	ND < 0.010	ND < 0.0050	0.052	ND < 1.0	ND < 1.0	ND < 1.0	ND < 1.0	9.1
Oct-99	106.70	ND < 0.010	ND < 0.010	ND < 0.0050	ND < 0.025	ND < 1.0	ND < 1.0	ND < 1.0	ND < 2.0	9.1

TABLE 6-1
PHIBRO-TECH, INC.
October 1999 Quarterly Monitoring
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS				PURGEABLE				HALOCARBONS Trichloroethene (ug/L)
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl- Benzene (ug/L)	Total Xylenes (ug/L)	
MW - 3										
Jan-89	95.02	ND < 0.01	0.014	0.003	ND < 0.009	7.4	17.0	4900.0	1500.0	74
Apr-89	99.29	ND < 0.5	0.07	ND < 0.01	ND < 0.02	ND < 50	ND < 50.0	1200.0	60.0	110
Jul-89	98.21	ND < 0.5	0.06	ND < 0.01	ND < 0.02	ND < 7	ND < 10.0	ND < 10.0	ND < 10.0	120
Oct-89	94.75	ND < 0.5	ND < 0.02	ND < 0.01	ND < 0.05	ND < 50	ND < 100.0	1600.0	150.0	ND < 100
Jan-90	95.98	ND < 0.02	ND < 0.01	ND < 0.01	ND < 0.02	ND < 5	ND < 5.0	110.0	ND < 10.0	65
Apr-90	97.72	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 50	ND < 50.0	2100.0	720.0	74
Jul-90	99.27	ND < 0.02	ND < 0.01	ND < 0.01	ND < 0.02	ND < 5	ND < 5.0	ND < 5.0	ND < 10.0	130
Oct-90	97.29	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	9	2.0	ND < 1.0	ND < 1.0	130
Jan-91	97.69	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	38
Apr-91	99.81	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	27
Jul-91	101.63	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	28
Oct-91	100.99	ND < 0.02	ND < 0.01	ND < 0.005	0.03	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	71
Jan-92	103.44	ND < 0.5	0.0081	ND < 0.0027	0.02	ND < 1	ND < 1.0	ND < 1.0	4.0	76
Apr-92	106.04	ND < 0.02	ND < 0.02	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 5.0	25
Jul-92	106.61	ND < 0.02	ND < 0.02	ND < 0.005	0.13	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	76
Oct-92	103.93	ND < 0.02	ND < 0.02	ND < 0.005	0.038	0.52	ND < 1.0	ND < 1.0	ND < 1.0	130
Jan-93	107.28	ND < 0.02	ND < 0.01	ND < 0.005	0.096	ND < 2.5	ND < 5.0	ND < 5.0	ND < 5.0	84
Apr-93	115.17	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	12
Jul-93	115.92	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	3.3	2.6	5.9	16
Oct-93	115.67	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	2.6	4.8	17
Jan-94	115.59	ND < 0.02/0.4**	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	10
Apr-94	116.33	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	15
Jul-94	116.91	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	26
Oct-94	110.85	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	1.2	3.5	1.5	12.0	76
Jan-95	111.83	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	72
Apr-95	117.83	ND < 0.02	0.0023	ND < 0.001	ND < 0.02	ND < 0.5	ND < 1.0	1.3	ND < 1.0	57
Jul-95	119.20	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	2.0	5.2	8.8	9.5
Oct-95	115.45	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	1.7	3.3	30
Jan-96	113.41	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	5.1	26
Apr-96	116.73	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	2.6	3.6	46
Jul-96	116.33	ND < 0.01	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	1.8	9.0	12.0	17
Oct-96	112.45	ND < 0.01	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	5.4	6.2	21
Jan-97	114.19	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	2.6	1.1	4.2	28
Apr-97	117.13	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	4.3	2.1	3.0	13
Jul-97	117.18	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	2.5	3.7	13
Oct-97	113.60	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	0.57	ND < 1.0	1.7	1.2	24
Jan-98	111.68	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	1.3	ND < 1.0	25
Apr-98	116.82	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	18
Jul-98	118.02	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	25
Oct-98	115.40	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	24
Jan-99	112.48	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	2.3	ND < 1.0	26
Apr-99	112.49	ND < 0.025	ND < 0.01	ND < 0.005	ND < 0.025	ND < 1.0	ND < 1.0	1.1	ND < 2.0	21
Jul-99	112.31	ND < 0.020	ND < 0.010	ND < 0.0050	ND < 0.025	ND < 1.0	ND < 1.0	1.3	ND < 1.0	43
Oct-99	104.42	ND < 0.010	ND < 0.010	ND < 0.0050	ND < 0.025	ND < 5.0	ND < 5.0	200	ND < 10	170

** Hexavalent chromium sample or result for MW03 likely switched with MW30 (dup. of MW04). Laboratory reported MW03 result of 0.4 mg/L and MW30 result of ND at a detection limit of 0.02 mg/L.

TABLE 6-1
PHIBRO-TECH, INC.
October 1999 Quarterly Monitoring
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS				PURGEABLE					HALOCARBONS
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl- Benzene (ug/L)	Total Xylenes (ug/L)	Trichloroethene (ug/L)	
MW - 4											
Jan-89	95.21	33.0	400.0	0.028	ND< 0.009	ND< 0.5	10.0	15.0	29.0	120	
Apr-89	99.19	43.0	100.0	0.05	0.02	ND< 5	23.0	15.0	50.0	280	
Jul-89	98.19	120.0	98.0	0.08	0.06	ND< 14	ND< 20.0	140.0	40.0	290	
Oct-89	94.92	110.0	120.0	0.07	ND< 0.05	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	250	
Jan-90	95.87	109.0	95.1	0.12	ND< 0.02	ND< 12	ND< 12.0	ND< 12.0	ND< 25.0	220	
Apr-90	97.50	81.7	80.7	0.13	0.02	ND< 10	ND< 10.0	ND< 10.0	ND< 20.0	280	
Jul-90	99.20	100.0	101.0	0.35	ND< 0.02	ND< 50	ND< 50.0	1600.0	170.0	320	
Oct-90	98.33	58.9	48.4	0.23	0.022	ND< 0.5	17.0	230.0	650.0	250	
Jan-91	97.68	49.4	65.3	0.26	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	1200.0	180	
Apr-91	100.50	23.8	18.4	0.076	ND< 0.02	ND< 0.5	ND< 1.0	730.0	ND< 1.0	170	
Jul-91	101.47	39.1	78.5	0.61	ND< 0.02	ND< 0.5	16000.0	6700.0	18000	190	
Oct-91	100.91	42.0	40.8	0.21	ND< 0.01	ND< 0.5	6900.0	4100.0	10000	ND< 400	
Jan-92	103.33	41.0	34.0	0.47	0.045	ND< 250	18,000	10,000	17,200	ND< 250	
Apr-92	105.94	32.2	29.2	0.84	0.053	6.7	7.2	960.0	1010.0	280	
Jul-92	106.5	79.9	59.7	0.86	ND< 0.02	ND< 5	ND< 10.0	200.0	280.0	280	
Oct-92	103.92	21.6	27.1	0.32	ND< 0.02	71	ND< 10.0	1300.0	230.0	230	
Jan-93	107.13	16.4	27.4	0.28	ND< 0.02	ND< 130	10000.0	10000	19000	ND< 250	
Apr-93	115	1.8	2.2	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	88.0	13.0	25	
Jul-93	115.52	21.0	23.2	0.2	0.056	0.6	2.0	1.8	11.0	100	
Oct-93	115.76	* 35.5/99.2	80.3	0.71	ND< 0.2	1.3	ND< 1.0	ND< 1.0	40.0	290	
Jan-94	115.42	0.36	36.0	0.23	ND< 0.02	0.81	ND< 1.0	8.3	14.0	130	
Apr-94	116.20	26.9	26.4	0.33	ND< 0.02	ND< 0.5	ND< 1.0	4.0	6.5	190	
Jul-94	116.76	59.0	41.4	0.20	0.038	0.58	ND< 1.0	ND< 1.0	4.2	340	
Oct-94	110.86	60.7	52.8	0.45	ND< 0.02	ND< 5	ND< 10.0	270.0	39.0	390	
Jan-95	111.88	28.8	34.3	0.13	0.026	ND< 5	ND< 10.0	350.0	130.0	190	
Apr-95	117.69	8.6	9.1	0.21	0.052	ND< 100	1600.0	1700.0	2900.0	67	
Jul-95	119.05	* 28.1/20.8	29.6	0.27	*.10/ND<0.02	ND< 10	* 270/410	* 260/380	* 890/1300	90	
Oct-95	115.35	**30.8	28.9	0.38	ND< 0.02	ND< 2.5	ND< 5.0	75.0	21.0	150	
Jan-96	113.37	25.7	32.4	0.19	ND< 0.02	ND< 50	100.0	2100.0	1400.0	160	
Apr-96	116.65	* 32.2/24.6	38.0	0.60	ND< 0.02	ND< 25	680.0	1300.0	1400.0	130	
Jul-96	116.17	50	58.9	0.28	ND< 0.02	ND< 50	ND< 100.0	1000.0	270.0	140	
Oct-96	112.38	63.8	75.7	0.46	ND< 0.04	ND< 50	380.0	1100.0	1900.0	310	
Jan-97	114.07	*45.9/34.9	34.5	0.54	0.02	ND< 6.2	ND< 12.0	1100.0	ND< 12.0	330	
Apr-97	116.96	27.3	18.8	0.53	ND< 0.02	ND< 12	35.0	1300.0	620.0	150	
Jul-97	117.04	36.0	35.2	0.62	ND< 0.02	ND< 5	ND< 10.0	810.0	110.0	150	
Oct-97	113.46	73.8	85.3	0.64	ND< 0.08	ND< 5	ND< 10.0	460.0	31.0	230	
Jan-98	111.66	39.2	44.0	0.53	ND< 0.02	ND< 5	ND< 10.0	530.0	420.0	180	
Apr-98	116.69	7.2	14.1	0.43	ND< 0.02	2.9	ND< 5.0	320.0	ND< 5.0	92	
Jul-98	117.95	16.3	18.9	0.32	ND< 0.02	ND< 12	ND< 25.0	1200.0	300.0	120	
Oct-98	115.31	34.1	36.2	0.44	0.030	ND< 6.2	ND< 12.0	740.0	240.0	120	
Jan-99	112.41	78.6	85.2	0.58	ND< 0.040	ND< 5.0	ND< 10	520.0	31.0	260	
Apr-99	112.43	*0.57/4.6	42.8	0.41	ND< 0.050	3.5	ND< 2.5	220	9.9	190	
Jul-99	112.33	41.1	49.7	0.42	ND < 0.050	ND < 10	ND < 10	670	67	140	
Oct-99	104.49	58.2	105	0.59	ND < 0.075	ND < 5.0	ND < 5.0	92	11	210	

* 35.5/99.2 = original sample/duplicate sample (both results presented because duplicate result deviation is >20%)

** Analyzed after holding time had expired.

TABLE 6-1
PHIBRO-TECH, INC.
October 1999 Quarterly Monitoring
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS						PURGEABLE					HALOCARBONS Trichloroethene (ug/L)			
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl- Benzene (ug/L)	Total Xylenes (ug/L)							
MW - 6B																
Jan-89	95.12	ND<	0.01	ND<	0.014	ND<	0.003	ND<	0.009	ND<	0.01	ND<	0.0	ND<	0.0	57
Apr-89	99.11	ND<	0.05		0.06	ND<	0.01	ND<	0.02	ND<	0.7	ND<	1.0	ND<	1.0	37
Jul-89	98.39	ND<	0.05		0.04	ND<	0.01	ND<	0.02	ND<	0.7	ND<	1.0	ND<	1.0	29
Oct-89	95.35	ND<	0.05	ND<	0.02	ND<	0.01	ND<	0.05	ND<	0.5	ND<	1.0	ND<	1.0	29
Jan-90	96.1	ND<	0.02	ND<	0.01	ND<	0.01	ND<	0.02	ND<	0.5	ND<	0.5	ND<	0.5	46
Apr-90	97.76	ND<	0.02		0.02	ND<	0.005	ND<	0.02	ND<	2.5	ND<	2.5	ND<	2.5	61
Jul-90	99.28	ND<	0.02		0.02	ND<	0.01	ND<	0.02	ND<	0.5	ND<	0.5	ND<	0.5	51
Oct-90	98.45	ND<	0.02		0.012	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	52
Jan-91	97.87	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	59
Apr-92	105.86	ND<	0.02		0.014	ND<	0.005	ND<	0.02	ND<	0.5	ND<	0.5		1.1	19
Jul-92	106.57	ND<	0.02		0.019	ND<	0.005		0.054	ND<	0.5	ND<	0.5	ND<	1.0	10
Oct-92	104.12	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5		12.0		2.9	9.3
Jan-93	107.23	ND<	0.02		0.011	ND<	0.005		0.038	ND<	0.5	ND<	1.0	ND<	1.0	6.9
Apr-93	114.64	ND<	0.02		0.014	ND<	0.005	ND<	0.02	ND<	0.5		64.0		26.0	88.0
Jul-93	115.34	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5		2.2		2.0	5.5
Oct-93	115.46	ND<	0.02		0.011	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	5.9
Jan-94	115.37	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	2.7
Apr-94	116.15	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	2.0
Jul-94	116.67	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5		1.1	ND<	1.0	1.9
Oct-94	111.13	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5		1.5	ND<	1.0	8.2
Jan-95	112.19	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	1		110.0		89.0	110.0
Apr-95	117.42	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5		1.6		9.1	6.2
Jul-95	118.93	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5		1.1		4.0	5.1
Oct-95	115.45	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	2.6
Jan-96	113.47	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	1		28.0		27.0	53.0
Apr-96	116.65	ND<	0.02		0.011	ND<	0.005	ND<	0.02	ND<	1		4.2		37.0	50.0
Jul-96	116.18	ND<	0.01	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0		2.3	3.5
Oct-96	112.66	ND<	0.01	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5		1.0		2.1	2.8
Jan-97	114.20	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5		4.3		4.3	6.4
Apr-97	116.95	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5		3.6		1.7	ND<
Jul-97	117.01	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	6.6
Oct-97	113.71	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	6.4
Jan-98	112.06	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5		15.0		32.0	39.0
Apr-98	116.76	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5		1.6		4.2	6.0
Jul-98	117.95	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	4.3
Oct-98	114.83	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	9.9
Jan-99	112.74	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5		5.0		24.0	29.0
Apr-99	112.56	ND<	0.01	ND<	0.01	ND<	0.005	ND<	0.025	ND<	1.0		19		42	33.9
Jul-99	112.43	ND < 0.020	ND < 0.010	ND < 0.0050	ND < 0.025	ND < 1.0	ND < 1.0	ND < 1.0	ND < 1.0	ND < 1.0	ND < 1.0	ND < 1.0	ND < 1.0	ND < 1.0	ND < 1.0	8.2
Oct-99	105.04	ND < 0.010	ND < 0.010	ND < 0.0050	ND < 0.025	ND < 1.0	ND < 1.0	ND < 1.0	ND < 1.0	ND < 1.0	ND < 1.0	ND < 1.0	ND < 1.0	ND < 1.0	ND < 1.0	12.0

TABLE 6-1
PHIBRO-TECH, INC.
October 1999 Quarterly Monitoring
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS						PURGEABLE				HALOCARBONS Trichloroethene (ug/L)						
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl- Benzene (ug/L)	Total Xylenes (ug/L)									
MW - 7																		
Jan-89	89.47	ND<	0.01	ND<	0.014	ND<	0.003	ND<	0.009	ND<	0.5	1.4	1.2	3.6	35			
Apr-89	98.83	ND<	0.05		0.02	ND<	0.01	ND<	0.02	ND<	0.7	ND<	1.0	ND<	1.0	47		
Jul-89	97.90	ND<	0.05		0.03	ND<	0.01	ND<	0.05	ND<	0.7	ND<	1.0	ND<	1.0	25		
Oct-89	94.72	ND<	0.05	ND<	0.02	ND<	0.01	ND<	0.05	ND<	0.5	ND<	1.0	ND<	1.0	44		
Jan-90	95.58	ND<	0.02	ND<	0.01	ND<	0.01	ND<	0.02	ND<	2.5	ND<	2.5	ND<	2.5	39		
Apr-90	97.32	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	2.5	ND<	2.5	ND<	2.5	46		
Jul-90	98.85	ND<	0.02	ND<	0.01	ND<	0.01	ND<	0.02	ND<	1	ND<	1.0	ND<	1.0	34		
Oct-90	98.02	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	19		
Jan-91	97.41	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	1.8		
Apr-91	100.06	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	30		
Jul-91	101.20	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	53		
Oct-91	100.62	ND<	0.02	ND<	0.01	ND<	0.005		0.01	ND<	0.5	ND<	1.0	ND<	1.0	54		
Jan-92	102.90		0.07	ND<	0.0081	ND<	0.0027		0.14	ND<	1	ND<	1.0	ND<	1.0	120		
Apr-92	105.54	ND<	0.02		0.013	ND<	0.005		0.032	ND<	0.5	ND<	1.0	ND<	1.0	55		
Jul-92	103.13	ND<	0.02		0.095	ND<	0.005		0.21	ND<	1	ND<	2.0	ND<	2.0	53		
Oct-92	103.68	ND<	0.02		0.063	ND<	0.005		0.65	ND<	0.5	ND<	1.0	ND<	1.0	98		
Jan-93	106.82	ND<	0.02		0.033	ND<	0.005		0.19	ND<	0.5	ND<	1.0	ND<	1.0	73		
Apr-93	114.54	ND<	0.02		0.011	ND<	0.005	ND<	0.02	ND<	1.2	ND<	2.5		90.0	5.6	23	
Jul-93	115.14	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	5	ND<	10.0		210.0	ND<	10.0	43
Oct-93	115.23	ND<	0.2	ND<	0.01	ND<	0.005		0.02		0.82	ND<	1.0		7.2	ND<	1.0	44
Jan-94	115.08	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02		1.4	ND<	1.0		33.0	ND<	1.0	53
Apr-94	115.88	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	2.5	ND<	5.0		200.0	ND<	5.0	96
Jul-94	116.44	ND<	0.02	ND<	0.01	ND<	0.005		0.023		0.88	ND<	1.0		7.7		1.2	140
Oct-94	110.69	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0		5.1		5.5	98
Jan-95	111.59	ND<	0.02	ND<	0.01	ND<	0.005		0.026	ND<	0.5		7.0		8.7		10.0	170
Apr-95	117.24	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0		1.3	ND<	1.0	26
Jul-95	118.63	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0		2.1		3.4	53
Oct-95	115.08	ND<	0.02		0.014	ND<	0.005		0.079		0.74	ND<	1.0		3.8		1.4	98
Jan-96	112.98	ND<	0.02	ND<	0.01	ND<	0.005		0.043		1.0		4.2		4.9		10.0	85
Apr-96	116.39	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5		1.3		11.0		14.0	37
Jul-96	115.83	ND<	0.01	ND<	0.01	ND<	0.005	ND<	0.02		1.0	ND<	1.0		1.6		2.7	87
Oct-96	112.17	ND<	0.01	ND<	0.01	ND<	0.005		0.036		0.96	ND<	1.0		1.4		1.5	150
Jan-97	113.76	ND<	0.02	ND<	0.01	ND<	0.005		0.029	ND<	0.5	ND<	1.0		1.7		2.8	95
Apr-97	116.62	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5		1.1		1.2	ND<	1.0	63
Jul-97	116.74	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02		0.56	ND<	1.0	ND<	1.0	ND<	1.0	54
Oct-97	111.27	ND<	0.02	ND<	0.01	ND<	0.005		0.025	ND<	0.5	ND<	1.0	ND<	1.0	ND<	1.0	85
Jan-98	111.47	ND<	0.02		0.01	ND<	0.005		0.044	ND<	0.5		2.2		5.2		6.8	97
Apr-98	116.38	ND<	0.02		0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0		1.6		1.8	23
Jul-98	117.62	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	ND<	1.0	53
Oct-98	115.06	ND<	0.02	ND<	0.01	ND<	0.005		0.042		0.68	ND<	1.0	ND<	1.0	ND<	1.0	88
Jan-99	112.28	ND<	0.02	ND<	0.01		0.0056		0.05	ND<	1.2	ND<	2.5	ND<	2.5	ND<	2.5	160
Apr-99	112.11	ND<	0.01	ND<	0.01	ND<	0.005		0.042	ND<	2.0		3.0		11		6.8	80
Jul-99	112.09	ND < 0.020		ND < 0.020	ND<0.010		0.068	ND <1.0		ND <1.0			1.3	ND <1.0				65
Oct-99	104.50	ND < 0.010		ND < 0.010	ND<0.0050		0.071	ND <2.0		ND <2.0			ND <2.0		ND <4.0			130

TABLE 6-1
PHIBRO-TECH, INC.
October 1999 Quarterly Monitoring
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS				PURGEABLE				HALOCARBONS	
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl- Benzene (ug/L)	Total Xylenes (ug/L)	Trichloroethene (ug/L)	
MW-9											
Jan-89	95.55	0.45	0.33	ND< 0.003	ND< 0.009	ND< 0.5	ND< 0.5	ND< 0.5	ND< 1.0	55	
Apr-89	99.67	ND< 0.02	0.06	ND< 0.01	ND< 0.02	ND< 0.7	ND< 1.0	ND< 1.0	ND< 1.0	24	
Jul-89	98.77	ND< 0.05	0.17	ND< 0.01	0.02	ND< 0.7	ND< 1.0	ND< 1.0	ND< 1.0	57	
Oct-89	95.62	2.5	1.8	ND< 0.01	ND< 0.05	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	110	
Jan-90	96.44	2.28	2.2	ND< 0.01	ND< 0.02	ND< 2.5	ND< 2.5	ND< 2.5	ND< 5.0	100	
Apr-90	98.26	0.8	0.81	ND< 0.005	ND< 0.02	ND< 2.5	ND< 2.5	ND< 2.5	ND< 5.0	150	
Jul-90	99.78	0.03	0.04	ND< 0.01	ND< 0.02	ND< 2.5	ND< 2.5	ND< 2.5	ND< 5.0	64	
Oct-90	98.69	0.25	0.19	ND< 0.005	0.062	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	17	
Jan-91	98.04	0.124	0.085	ND< 0.005	ND< 0.02	ND< 0.5	6.6	1.4	9.0	26	
Apr-91	100.83	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	26	
Jul-91	101.88	ND< 0.02	0.027	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	99.0	ND< 1.0	41	
Oct-91	101.30	0.05	0.07	ND< 0.005	ND< 0.01	ND< 0.5	ND< 1.0	94.0	ND< 1.0	120	
Jan-92	103.62	ND< 0.05	ND< 0.0081	ND< 0.0027	0.031	ND< 1	ND< 1.0	1220.0	92.0	45	
Apr-92	106.27	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.05	2800.0	3600.0	6190.0	52	
Jul-92	106.93	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.05	34000.0	7900.0	24000	N D 1000	
Oct-92	104.3	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 1000	83000.0	13000	58000	N D 1000	
Jan-93	107.56	ND< 0.02	0.057	ND< 0.005	0.053	ND< 50	400.0	3900.0	5300.0	ND< 100	
Apr-93	115.26	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 50	5100.0	4000.0	9200.0	110	
Jul-93	115.81	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 16	ND< 33.0	160.0	74.0	1100	
Oct-93	115.79	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 2.5	ND< 5.0	120.0	45.0	390	
Jan-94	115.76	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 10	48.0	290.0	220.0	230	
Apr-94	116.51	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 500	17000.0	12000	32000	270	
Jul-94	117.03	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 1000	56000.0	15000	40000	200	
Oct-94	111.17	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 500	57000.0	11000	34000	350	
Jan-95	112.25	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 250	8200.0	9800.0	2000.0	310	
Apr-95	117.92	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 50	ND< 100.0	650.0	480.0	670	
Jul-95	119.31	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 10	69.0	780.0	340.0	540	
Oct-95	115.67	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 25	110.0	670.0	1900.0	320	
Jan-96	113.73	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 50	100.0	4300.0	6100.0	500	
Apr-96	117.00	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	3.3	5.5	24.0	22.0	580	
Jul-96	116.49	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.02	4.6	ND< 2.0	42.0	4.3	570	
Oct-96	112.73	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.02	ND< 50	ND< 100.0	2900.0	350.0	470	
Jan-97	114.46	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 2.5	ND< 5.0	ND< 5.0	ND< 5.0	400	
Apr-97	117.29	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 5	ND< 10.0	18.0	ND< 10.0	770	
Jul-97	117.34	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 25	ND< 50.0	2500.0	860.0	850	
Oct-97	113.75	ND< 0.02	0.048	ND< 0.005	ND< 0.02	ND< 25	150.0	1900.0	4800.0	ND< 50	
Jan-98	112.06	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 5	ND< 10.0	690.0	260.0	270	
Apr-98	117.07	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 5	ND< 10.0	23.0	ND< 10.0	390	
Jul-98	118.26	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 12	ND< 25.0	73.0	ND< 25.0	1300	
Oct-98	115.49	3.3	1.3	0.0075	0.34	7.4	ND< 12.0	390.0	ND< 12.0	1200	
Jan-99	112.68	3.3	2.4	ND< 0.005	ND< 0.02	ND< 6.2	ND< 12.0	100.0	83.0	550	
Apr-99	112.77	ND< 0.01	0.64	ND< 0.005	ND< 0.025	ND< 5.0	ND< 5.0	ND< 5.0	ND< 5.0	350	
Jul-99	112.57	5.8	5.6	ND < 0.010	ND < 0.050	ND < 25	ND < 25	ND < 25	ND < 25	810	
Oct-99	104.91	4	4.2	ND < 0.0050	ND < 0.025	ND < 5.0	ND < 5.0	ND < 5.0	ND < 10	280	

TABLE 6-1
PHIBRO-TECH, INC.
October 1999 Quarterly Monitoring
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS						PURGEABLE				HALOCARBONS Trichloroethene (ug/L)						
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl- Benzene (ug/L)	Total Xylenes (ug/L)									
MW - 11																		
Jan-89	95.97	ND<	0.01	ND<	0.014	ND<	0.003	ND<	0.009	ND<	0.5	ND<	0.5	43.0	1.5	34		
Apr-89	99.85	ND<	0.02	ND<	0.04	ND<	0.01	ND<	0.02	ND<	500	7500.0	2600.0	11000		39		
Jul-89	98.95	ND<	0.05	ND<	0.02	ND<	0.01	ND<	0.13	ND<	7	ND<	10.0	ND<	90.0	29		
Oct-89	95.77	ND<	0.05	ND<	0.02	ND<	0.01	ND<	0.05	ND<	5	ND<	10.0	200.0	ND<	10.0	35	
Jan-90	96.72	ND<	0.02	ND<	0.01	ND<	0.01	ND<	0.02	ND<	5	ND<	5.0	83.0	ND<	10.0	46	
Apr-90	98.44	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	2.5	2.6	370.0	150.0		33		
Jul-90	100.00	ND<	0.02	ND<	0.01	ND<	0.01	ND<	0.03	ND<	25	440.0	1000.0	760.0		65		
Oct-90	98.97	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	15000.0	3000.0	10000	ND<	1		
Jan-91	98.29	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	15000.0	4700.0	12000	ND<	1		
Apr-91	101.17	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	8500.0	3300.0	7500.0		63		
Jul-91	102.19	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	57.0	520.0	220.0		61		
Oct-91	101.61	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.01	ND<	0.5	140.0	2000.0	660.0		110		
Jan-92	104.09	ND<	0.10	ND<	0.0081	ND<	0.0027	ND<	0.02	ND<	1	7.3	230.0	26.0		85		
Apr-92	106.61	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.01	ND<	0.05	1.7	130.0	2.3		70		
Jul-92	107.12	ND<	0.02	ND<	0.02	ND<	0.005	ND<	0.09	ND<	0.05	ND<	0.1	17.0	ND<	0.1	160	
Oct-92	104.55	ND<	0.02	ND<	0.011	ND<	0.005	ND<	0.01	ND<	0.05	ND<	0.1	11.0	ND<	0.1	160	
Jan-93	108.27	ND<	0.02	ND<	0.013	ND<	0.005	ND<	0.088	ND<	1.2	ND<	2.5	110.0	ND<	2.5	86	
Apr-93	115.6	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.05	ND<	1.0	2.0	ND<	1.0	59	
Jul-93	116.07	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.05	2.5	1.8	6.4		230		
Oct-93	116.01	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	2.1		3.1	150	
Jan-94	116.03	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	2.5		2.8	190	
Apr-94	116.83	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	ND<	1.0	80
Jul-94	117.23	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0		1.6	180
Oct-94	111.30	ND<	0.02	ND<	0.011	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	4.5	ND<	1.0	360	
Jan-95	112.53	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	10	660.0	850.0	1100.0		660		
Apr-95	118.26	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	50	ND<	100.0	1900.0	1000.0		74	
Jul-95	119.51	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	2.5	ND<	5.0	160.0		37.0	140	
Oct-95	115.80	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	5.8		2.2	180	
Jan-96	113.98	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	25	520.0	460.0	1000.0		620		
Apr-96	117.37	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.023	ND<	25	160.0	1100.0	1400.0		240		
Jul-96	116.75	ND<	0.01	ND<	0.01	ND<	0.005	ND<	0.02	ND<	10	ND<	20.0	460.0	290.0		220	
Oct-96	112.95	ND<	0.01	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	1.9	20.0	8.0		250		
Jan-97	114.78	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.029	ND<	0.5	9.4	84.0	88.0		160		
Apr-97	117.60	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	2.5	ND<	5.0	120.0		8.2	370	
Jul-97	117.61	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.15	ND<	2.5	ND<	5.0	8.3	ND<	5.0	240	
Oct-97	114.02	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.1	ND<	2.5	ND<	5.0	ND<	5.0	ND<	5.0	350
Jan-98	112.23	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	12	770.0	1800.0	2200.0		390		
Apr-98	117.36	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.077	ND<	1.2	63.0	150.0	210.0		180		
Jul-98	118.57	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.077	ND<	1.2	ND<	2.5	41.0		4.8	150	
Oct-98	115.91	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.041	ND<	5	ND<	10.0	ND<	10.0	ND<	10.0	430
Jan-99	113.05	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	6.2	260.0	750.0	970.0		690		
Apr-99	113.14	ND<	0.01	ND<	0.01	ND<	0.005	ND<	0.025	ND<	25	670	1600	1270		480		
Jul-99	112.88	ND < 0.020	ND < 0.010	ND < 0.0050	ND < 0.025	ND < 10	ND < 10					85	ND < 10			740		
Oct-99	105.05	0.057	0.02	ND < 0.0050	ND < 0.025	ND < 10	ND < 10					480		52		650		

TABLE 6-1
PHIBRO-TECH, INC.
October 1999 Quarterly Monitoring
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS				PURGEABLE					HALOCARBONS Trichloroethene (ug/L)	
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)		Toluene (ug/L)	Ethyl- Benzene (ug/L)	Total Xylenes (ug/L)		
MW - 14S												
Oct-90	98.07	3.2	2.2	0.018	5.3	ND< 0.5	ND< 1.0	1750.0	ND< 1.0	180		
Jan-91	97.38	0.4	0.94	0.007	1	ND< 0.5	ND< 1.0	2800.0	5900.0	108		
Apr-91	99.26	0.39	0.41	0.005	0.15	ND< 0.5	ND< 1.0	4100.0	ND< 1.0	84		
Jul-91	101.27	0.02	0.31	0.005	0.11	ND< 0.5	ND< 1.0	31.0	ND< 1.0	55		
Oct-91	100.66	0.13	0.23	ND< 0.005	0.05	ND< 0.5	ND< 1.0	680.0	ND< 1.0	81		
Jan-92	103.08	0.27	0.15	ND< 0.0027	0.093	ND< 1	ND< 1.0	ND< 1.0	ND< 1.0	59		
Apr-92	105.70	0.13	0.16	ND< 0.005	0.04	ND< 0.5	ND< 0.5	ND< 0.5	ND< 0.5	56		
Jul-92	106.38	0.1	0.33	ND< 0.005	0.56	0.6	ND< 1.0	ND< 1.0	ND< 1.0	44		
Oct-92	103.72	0.16	0.54	ND< 0.005	0.72	ND< 1	ND< 1.0	ND< 1.0	ND< 1.0	71		
Jan-93	107.00	0.056	0.24	ND< 0.005	0.33	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	56		
Apr-93	114.80	ND< 0.02	0.018	ND< 0.005	0.032	ND< 0.5	24.0	40.0	55.0	18		
Jul-93	115.36	ND< 0.02	0.20	ND< 0.005	0.023	ND< 0.5	1.3	1.2	3.8	25		
Oct-93	115.42	ND< 0.02	0.01	ND< 0.005	0.021	ND< 0.5	ND< 1.0	2.1	3.7	25		
Jan-94	115.28	ND< 0.02	0.015	ND< 0.005	0.022	ND< 0.5	ND< 1.0	3.2	1.4	21		
Apr-94	116.06	ND< 0.02	0.022	ND< 0.005	ND< 0.020	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	29		
Jul-94	116.64	ND< 0.02	0.016	ND< 0.005	ND< 0.020	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	15		
Oct-94	110.70	0.035	0.064	ND< 0.005	ND< 0.020	0.53	ND< 1.0	ND< 1.0	ND< 1.0	58		
Feb-95	113.10	ND< 0.02	0.016	ND< 0.005	0.020	ND< 50	ND< 100.0	3000.0	690.0	50		
Apr-95	117.50	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.020	ND< 5	76.0	120.0	190.0	20		
Jul-95	118.93	ND< 0.02	ND< 0.01	0.0055	ND< 0.020	ND< 0.5	2.8	26.0	12.0	22		
Oct-95	115.25	0.022	0.046	ND< 0.005	ND< 0.020	ND< 0.5	ND< 1.0	2.1	2.0	35		
Jan-96	113.13	ND< 0.02	0.034	ND< 0.005	0.024	ND< 1	4.7	87.0	58.0	42		
Apr-96	116.52	0.021	0.028	ND< 0.005	ND< 0.020	ND< 2.5	54.0	120.0	110.0	51		
Jul-96	116.04	ND< 0.01	0.069	ND< 0.005	ND< 0.020	0.58	ND< 1.0	20.0	10.0	37		
Oct-96	112.22	0.052	0.082	ND< 0.005	ND< 0.020	ND< 0.5	ND< 1.0	13.0	2.9	61		
Jan-97	113.85	0.024	0.031	ND< 0.005	ND< 0.020	ND< 2.5	ND< 5.0	470.0	ND< 5.0	90		
Apr-97	116.82	ND< 0.02	0.032	0.0053	ND< 0.020	0.58	2.9	91.0	36.0	45		
Jul-97	117.21	ND< 0.02	0.016	ND< 0.005	ND< 0.020	ND< 5	ND< 1.0	14.0	1.0	35		
Oct-97	113.39	0.1	0.013	ND< 0.005	ND< 0.020	ND< 0.5	ND< 1.0	20.0	1.8	57		
Jan-98	111.43	* N D/0.0103	0.018	ND< 0.005	ND< 0.020	ND< 0.5	1.1	19.0	5.0	50		
Apr-98	116.47	ND< 0.02	0.018	ND< 0.005	0.023	ND< 12	ND< 25.0	1500.0	150.0	38		
Jul-98	117.79	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.020	0.51	ND< 1.0	18.0	8.4	18		
Oct-98	115.19	0.032	0.044	ND< 0.005	0.027	ND< 1.2	ND< 2.5	120.0	29.0	62		
Jan-99	112.31	0.058	0.032	ND< 0.005	ND< 0.020	1.1	ND< 2.0	77.0	64.0	98		
Apr-99	112.21	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.025	ND< 12	ND< 12	820	47	84		
Jul-99	112.19	ND < 0.020	0.038	ND < 0.0050	0.037	ND < 50	ND < 50	3,000	ND < 50	74		
Oct-99	104.31	0.035	0.15	0.006	0.044	ND < 5.0	ND < 5.0	120	ND < 10	180		

* ND/10.3 = EPA method 7196/EPA Method 218.6 (Sample was analyzed for hexavalent chromium by two methods.)

TABLE 6-1
PHIBRO-TECH, INC.
October 1999 Quarterly Monitoring
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS				PURGEABLE				HALOCARBONS Trichloroethene (ug/L)
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl- Benzene (ug/L)	Total Xylenes (ug/L)	
MW - 15S										
Oct-90	97.71	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	21
Jan-91	97.10	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	4.0	1.6	4.0	13
Apr-91	99.71	ND< 0.02	ND< 0.01	0.011	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	28
Jul-91	100.94	ND< 0.02	ND< 0.01	0.014	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	17
Oct-91	100.35	ND< 0.02	0.01	0.02	0.06	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	13
Jan-92	102.72	ND< 0.051	ND< 0.0081	0.008	0.01	ND< 1	ND< 1.0	ND< 1.0	ND< 1.0	15
Apr-92	105.29	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.01	ND< 0.5	ND< 0.5	ND< 0.5	ND< 0.5	4.1
Jul-92	105.95	ND< 0.02	0.04	0.005	0.27	ND< 0.5	ND< 0.5	ND< 0.5	ND< 0.5	2.9
Oct-92	103.37	ND< 0.02	ND< 0.02	0.0073	0.047	ND< 0.5	ND< 0.5	ND< 0.5	ND< 0.5	ND 1
Jan-93	106.58	ND< 0.02	0.014	0.0085	0.1	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	9.0
Apr-93	114.41	ND< 0.02	0.013	ND< 0.005	ND< 0.02	ND< 0.5	14.0	10.0	22.0	4.6
Jul-93	115.01	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	1.2	ND< 1.0	2.4	2.4
Oct-93	115.07	ND< 0.04	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	3.2
Jan-94	114.90	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	1.9
Apr-94	115.72	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	3.1
Jul-94	116.31	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	2.1
Oct-94	110.42	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	6.0
Jan-95	111.14	0.048	0.044	ND< 0.005	ND< 0.02	ND< 1	4.0	64.0	27.0	3.7
Apr-95	117.15	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 2.5	60.0	82.0	130.0	2.8
Jul-95	118.61	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	2.5	18.0	12.0	5.2
Oct-95	114.45	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	1.0	ND< 1.0	3.9
Jan-96	112.69	ND< 0.02	0.012	ND< 0.005	ND< 0.02	ND< 0.5	1.8	25.0	22.0	3.8
Apr-96	116.09	ND< 0.02	0.015	ND< 0.005	ND< 0.02	ND< 0.5	13.0	40.0	45.0	2.8
Jul-96	115.69	ND< 0.01	0.014	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	9.7	5.4	3.2
Oct-96	111.81	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	2.9	2.6	5.3
Jan-97	113.42	ND< 0.02	0.01	ND< 0.005	ND< 0.02	ND< 0.5	5.5	69.0	1.0	5.1
Apr-97	116.35	ND< 0.02	0.01	ND< 0.005	ND< 0.02	ND< 0.5	9.3	21.0	8.5	3.3
Jul-97	116.60	ND< 0.02	0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	8.2	1.3	4.1
Oct-97	113.08	ND< 0.02	0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	17.0	1.7	5.2
Jan-98	111.06	* N D/0.0177	0.021	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	12.0	3.7	5.0
Apr-98	116.05	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	60.0	7.2	3.1
Jul-98	117.47	ND< 0.02	0.014	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	10.0	2.9	3.4
Oct-98	114.87	ND< 0.02	0.017	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	45.0	12.0	3.9
Jan-99	111.98	0.024	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	19.0	2.2	7.0
Apr-99	111.85	ND< 0.01	0.013	ND< 0.005	ND< 0.025	ND< 1.0	ND< 1.0	23	2.2	4.2
Jul-99	111.89	ND < 0.020	0.010	ND < 0.0050	ND < 0.025	ND < 1.0	ND < 1.0	29	23	3.9
Oct-99	104.07	0.014	0.015	ND < 0.0050	ND < 0.025	ND < 2.0	ND < 2.0	12	ND < 4.0	6.7

* ND/0.0177 = EPA method 7196/EPA Method 218.6 (Sample was analyzed for hexavalent chromium by two methods.)

TABLE 6-1
PHIBRO-TECH, INC.
October 1999 Quarterly Monitoring
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS						PURGEABLE AROMATICS				HALOCARBONS						
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl-Benzene (ug/L)	Total Xylenes (ug/L)	Trichloroethene (ug/L)								
MW - 16																		
Apr-92	105.99	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.01	ND<	0.5	0.7	1.0	1.6	52			
Jul-92	106.7	ND<	0.02		0.03	ND<	0.02		0.35	ND<	0.5	ND<	1.0	ND<	1.0	35		
Oct-92	104.07	ND<	0.02		0.011	ND<	0.005		0.15	ND<	0.5	ND<	1.0	ND<	1.0	72		
Jan-93	107.3	ND<	0.02	ND<	0.01	ND<	0.005		0.44	ND<	1.2	ND<	2.5	ND<	2.5	51		
Apr-93	114.9	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	25	55.0	2300.0	1200.0		42		
Jul-93	115.54	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	50	100.0	3100.0	2000.0		15		
Oct-93	115.51	ND<	0.04	ND<	0.01	ND<	0.005	ND<	0.02	ND<	5.0	ND<	10.0	340.0	ND<	10.0	24	
Jan-94	115.46	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.02	ND<	20.0	1000.0	ND<	20.0	22	
Apr-94	116.25	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	10	ND<	20.0	820.0	ND<	20.0	37	
Jul-94	116.78	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	25	ND<	50.0	1300.0		730.0	76	
Oct-94	111.02	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	1.5	2.4			9.7	91	
Jan-95	112.08	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	ND<	1.0	17
Apr-95	117.60	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	5	16.0	36.0			55.0	34	
Jul-95	118.99	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	10	ND<	20.0	* 540/370	ND<	20.0	67	
Oct-95	115.45	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	1.8		1.3	60	
Jan-96	113.49	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	11.0		9.7	26	
Apr-96	116.72	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	9.8	30.0			33.0	36	
Jul-96	116.24	ND<	0.01	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	6.6		3.6	110	
Oct-96	112.59	ND<	0.01	ND<	0.01	ND<	0.005	ND<	0.02	ND<	5	49.0	130.0			230.0	73	
Jan-97	114.18	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	1	4.6	23.0	ND<		2.0	32	
Apr-97	117.01	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	1	ND<	2.0	7.2		2.4	31	
Jul-97	117.12	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	1.2	ND<	2.5	6.5	ND<	2.5	30	
Oct-97	113.66	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	2.5	ND<	5.0	8.2	ND<	5.0	53	
Jan-98	111.92	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	12.0	ND<	3.8	29	
Apr-98	116.79	ND<	0.02	ND<	0.01	ND<	0.005		0.023	ND<	0.5	ND<	1.0	28.0		2.7	29	
Jul-98	118.00	ND<	0.02	ND<	0.01	ND<	0.005		0.031	ND<	0.5	ND<	1.0	6.0		1.8	28	
Oct-98	115.42	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	2.5	ND<	5.0	16.0	ND<	5.0	58	
Jan-99	112.68	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	1.0	ND<	2.0	11.0	ND<	2.0	36	
Apr-99	112.59	ND<	0.01	ND<	0.01	ND<	0.005	ND<	0.025	ND<	2.0	ND<	2.0	6.1	ND<	2.0	39	
Jul-99	112.43	ND < 0.020	ND < 0.025	ND < 0.0050	ND < 0.025	ND < 2.0	ND < 2.0							33	ND < 2.0		29	
Oct-99	104.81	ND < 0.010	ND < 0.025	ND < 0.0050	ND < 0.025	ND < 5.0	ND < 5.0					ND < 5.0	ND < 10				42	

ND = Below detection limit as noted

MSL = Mean Sea Level

* 540/370 = original sample/duplicate sample (both results presented because duplicate result deviation is >20%)

TABLE 6-2
PHIBRO-TECH, INC.
October 1999 Quarterly Monitoring Well Sampling
Purgeable Halogenated Organic Analytical Results
(µg/L)

Well Identification	Tetrachloroethene (PCE)	Trichloroethene (TCE)	1,1-Dichloroethene (1,1-DCE)	1,1-Dichloroethane (1,1-DCA)	1,2-Dichloroethane (1,2-DCA)	Carbon Tetrachloride (CCL4)	Chloroform (CHCL3)	cis-1,2-Dichloroethene (cis-1,2-DCE)	trans-1,2-Dichloroethene (trans-1,2-DCE)	1,1,1-Trichloroethane (1,1,1-TCA)	Methylene Chloride (CH2CL2)
PTI- MW01S	ND<1.0	9.1	ND<1.0	1.1	1.5	ND <1.0	ND <1.0	3.9	ND <1.0	ND <1.0	ND <1.0
PTI- MW01D	4.9	2.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI- MW03	ND<5.0	170	23	15	14	61	39	ND<5.0	ND<5.0	ND<5.0	ND<5.0
PTI- MW04	ND <5.0	210	82	170	85	ND <5.0	25	160	ND <5.0	ND <5.0	130
PTI- MW04A	2.0	4.5	ND <1.0	1.4	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI- MW06B	1.8	12	1.6	1.5	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI- MW06D	ND<1.0	8.8	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI- MW07	ND<2.0	130	18	71	7.0	ND <2.0	2.7	35	5.7	ND <2.0	ND <2.0
PTI- MW09	ND<5.0	280	86	160	85	ND<5.0	92	7.4	ND<5.0	ND<5.0	250
PTI- MW11	ND<10	650	56	110	110	ND <10	18	21	ND <10	ND <10	ND <10
PTI- MW14S	ND<5.0	180	56	67	22	37	32	12	ND<5.0	ND<5.0	ND<5.0
PTI- MW15S	ND<2.0	6.7	ND<2.0	ND<2.0	110	ND<2.0	2.1	ND<2.0	ND<2.0	ND<2.0	ND<2.0
PTI- MW15D	1.5	5.1	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI- MW16	ND<5.0	42	30	220	26	ND<5.0	ND<5.0	41	8.4	ND<5.0	ND<5.0
MCL	5.0	5.0	6.0	5.0	0.5	0.5	NE	6.0	10	200	5.0
SGV GW*	ND-1.1	ND-1.3	ND	ND	ND	ND	ND	ND	ND	ND	ND

All analyses performed by EPA Method 8260.

ND = Analytical parameter not detected

MW = Monitoring Well

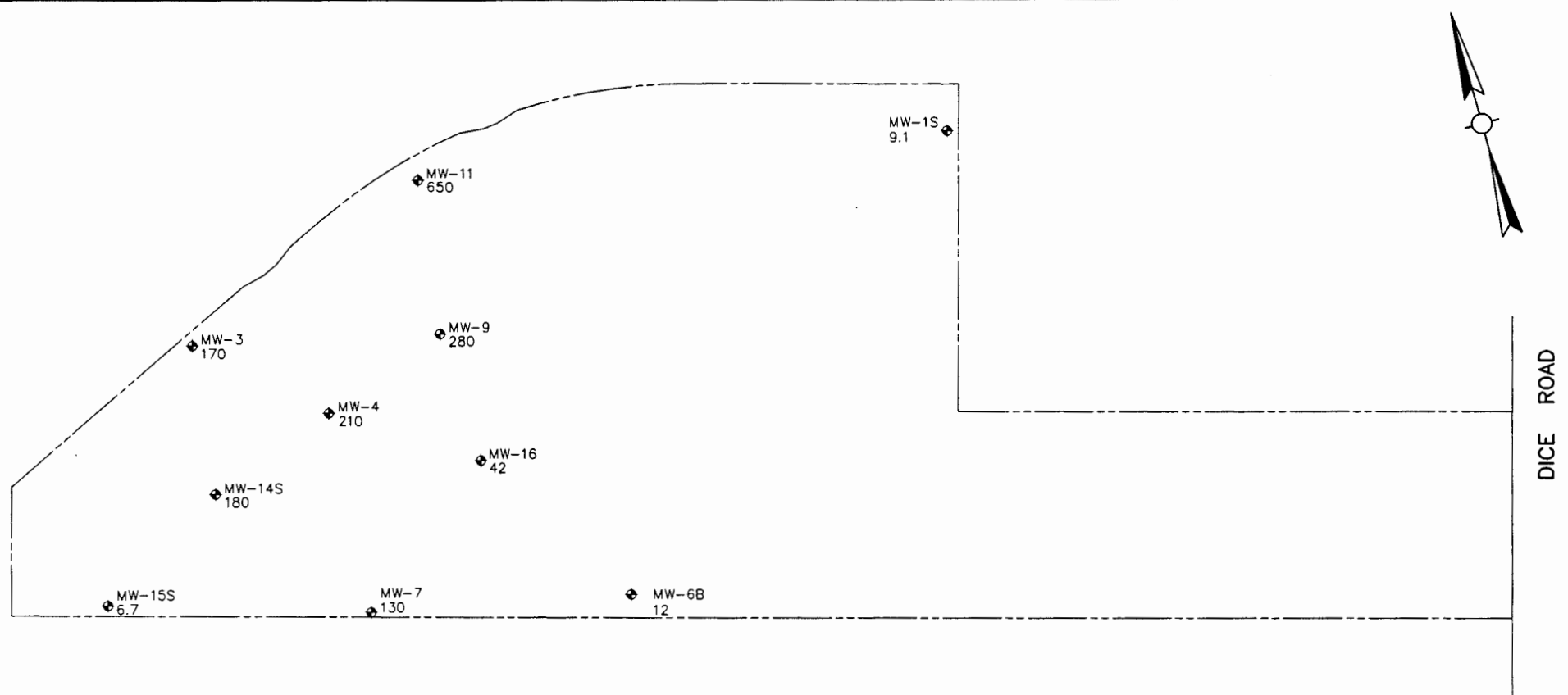
MCL = Maximum Contaminant Limit

SGV GW = Range of concentrations in water supply wells tested in the Santa Fe Springs area during the year 1998.

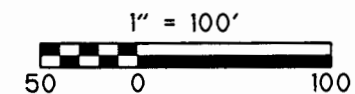
NA - Not Available

* - Up to 65 regulated and unregulated organics were analyzed. Only those detected at or above the reporting limit are listed.

NE - Not Established

**LEGEND**

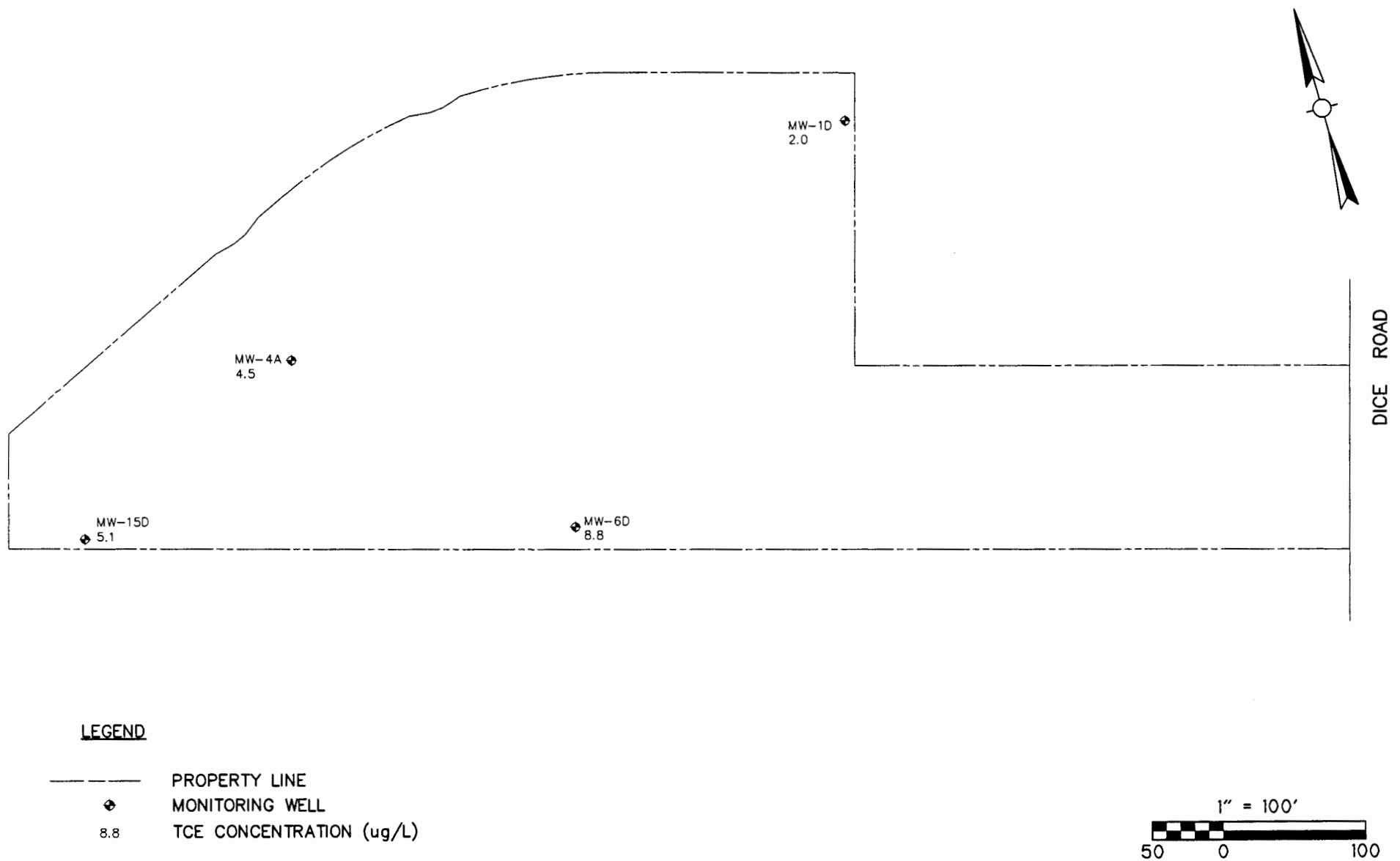
---	PROPERTY LINE
◆	MONITORING WELL
6.7	TOTAL TCE CONCENTRATION (ug/L)
ND	NOT DETECTED



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TCE - Shallow Wells
October 1999**CDM**environmental engineers, scientists,
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Figure 6-1



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TCE Concentrations - Deep Wells October 1999

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Figure 6-2

2.0 µg/L in MW-01D to 8.8 µg/L in MW-06D. Concentrations for TCE detected in shallow and deep wells are shown on Figures 6-1 and 6-2, respectively.

A review of the analytical results contained in Table 6-1 reveals that, with minor exceptions, TCE has historically been detected in all on-site monitoring wells, including the upgradient wells. Past discussions with Department of Health Services (now Cal EPA Department of Toxic Substances Control) and Regional Water Quality Control Board staff indicate that TCE is generally recognized as a regional groundwater contaminant.

Other Halogenated Organics

During the October 1999 sampling, other purgeable halocarbon compounds were detected in most of the on-site wells at concentrations ranging from 1.1 µg/L for 1,1-dichloroethane (MW-01S) to 220 µg/L for 1,1-dichloroethane (MW-16). The compounds tetrachloroethene; chloroform; 1,1-dichloroethene; 1,2-dichloroethane; carbon tetrachloride; methylene chloride; and cis- and trans-1,2-dichloroethene were also detected in several wells. Detections of these other chlorinated organic compounds are assumed to be related to the TCE plume.

6.2 Purgeable Aromatic Organic Compounds

According to PTI personnel, organic chemicals have not historically been used on-site in any of the production processes. Two 10,000 gallon underground storage tanks (diesel and gasoline), however, were located in the approximate center of the facility, due east of the drum wash area. During tank removal operations in July 1989, petroleum hydrocarbon contamination was discovered in the tank excavation. The RFI report indicated that petroleum hydrocarbon contamination was not detected at depths below 30 feet near the former tank locations. Although they have not been used on-site, purgeable aromatic compounds have been historically detected in groundwater underlying the facility. The primary organic compounds of concern are toluene, ethylbenzene and total xylenes, which vary in both concentration and lateral extent. The RFI report indicated that these compounds appeared to be migrating onto the subject property from the property to the north. According to Los Angeles County Department of Public Works files, leaks from tanks containing purgeable aromatic compounds with subsequent groundwater contamination are known to have occurred at the property to the north of PTI.

Purgeable aromatic compound results for October 1999 are presented in Table 6-3. Concentrations of total aromatic compounds for the shallow wells are illustrated on Figure 6-3. Historic sampling results indicate that purgeable aromatic contamination originated off-site to the north and has migrated onto the subject property. During previous sampling events, elevated concentrations of toluene, ethylbenzene and xylenes were detected in MW-11 and MW-3 along the northern perimeter of the property. Since approximately July 1991, elevated concentrations of these compounds have been detected in well MW-04, indicating that the plume may be migrating down gradient. In addition, high concentrations have also been detected in well MW-09 beginning in January 1992. However, for the last three sampling events no purgeable aromatic compounds were detected in MW-09. High concentrations of ethylbenzene and total xylenes were detected in MW-14S in February 1995 in MW-14S. October 1999 analytical results indicate that ethylbenzene was detected at a concentration of 120 µg/L and that total xylenes were not detected at concentrations greater than the detection limit.

TABLE 6-3
PHIBRO-TECH, INC.
October 1999 Quarterly Monitoring Well Sampling
Purgeable Aromatic Organic Analytical Results
(µg/L)

Well Identification	Benzene	Toluene	Ethylbenzene	Xylenes (Total)
PTI- MW01S	ND <1.0	ND <1.0	ND <1.0	ND <2.0
PTI- MW01D	ND <1.0	ND <1.0	ND <1.0	ND <2.0
PTI- MW03	ND <5.0	ND <5.0	200	ND <10
PTI- MW04	ND <5.0	ND <5.0	92	11
PTI- MW04A	ND <1.0	ND <1.0	ND <1.0	ND <2.0
PTI- MW06B	ND <1.0	ND <1.0	4.8	ND <2.0
PTI- MW06D	ND <1.0	ND <1.0	2.9	ND <2.0
PTI- MW07	ND <2.0	ND <2.0	ND <2.0	ND <4.0
PTI- MW09	ND <5.0	ND <5.0	ND <5.0	ND <10
PTI- MW11	ND <10	ND <10	480	52
PTI- MW14S	ND <5.0	ND <5.0	120	ND <10
PTI- MW15S	ND <2.0	ND <2.0	12	ND <4.0
PTI- MW15D	ND <1.0	ND <1.0	6.0	ND <2.0
PTI- MW16	ND <5.0	ND <5.0	ND <5.0	ND <10
MCL	1.0	150	700	1,750
SGV GW	ND	ND	ND	ND

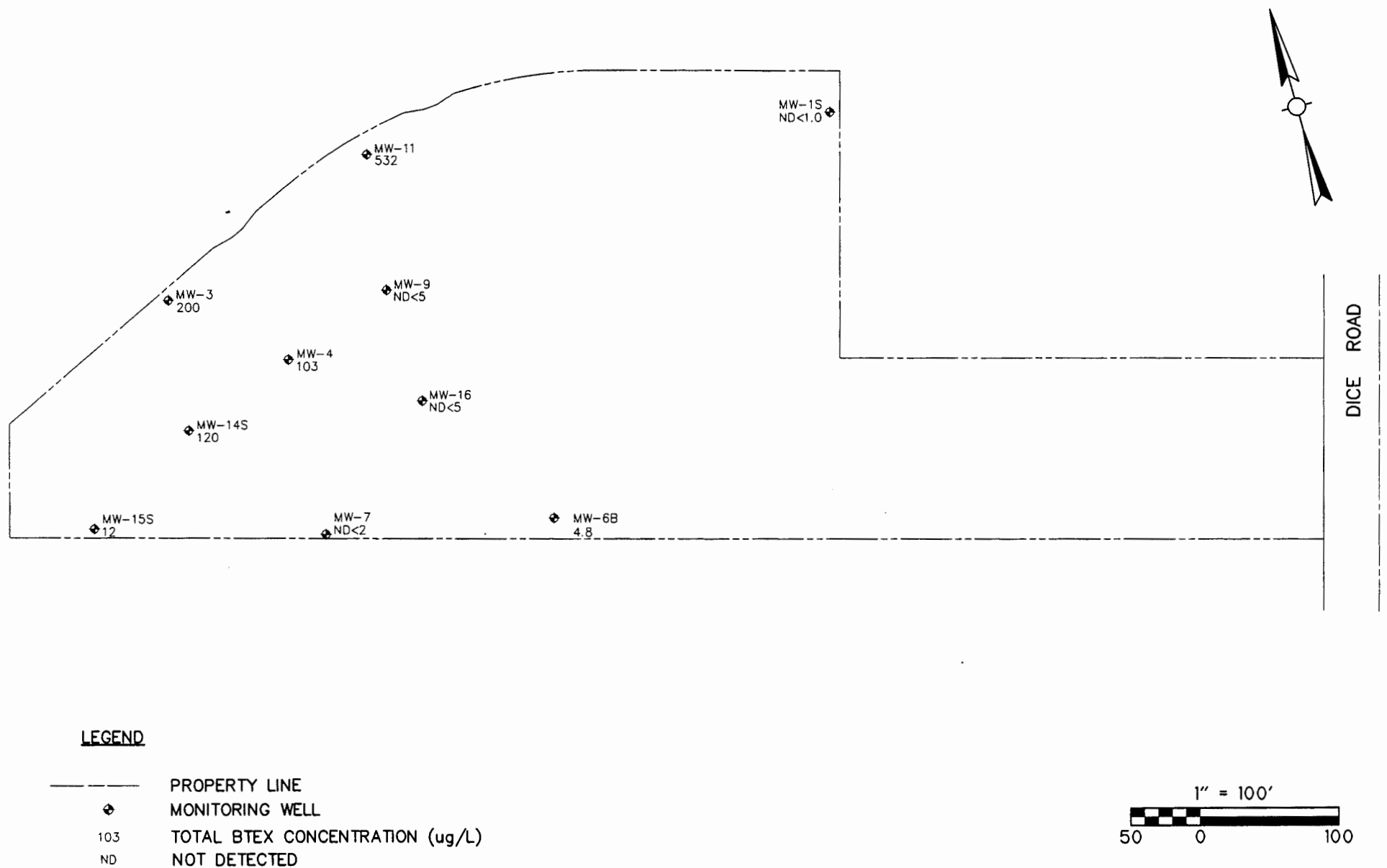
All analyses performed by EPA Method 8260.

ND = Analytical parameter not detected

MW = Monitoring Well

MCL = Maximum Contaminant Limit

SGV GW = Range of concentrations in water supply wells tested in the Santa Fe Springs area during the year 1998.



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Total BTEX Concentrations - Shallow Wells October 1999

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The results of the October 1999 sampling show that the highest concentrations of total purgeable aromatics (BTEX) were detected in MW-11 (Figure 6-3), which had an ethylbenzene concentration of 480 µg/L and total BTEX concentration of 532 µg/L. The second highest total BTEX concentration was detected in well MW-03, which had an ethylbenzene concentration of 200 µg/L and total BTEX of 200 µg/L.

Benzene

As in July 1999, benzene was not detected in any of the wells during the October 1999 event. Historical evidence indicates that benzene is not a contaminant of concern for the facility.

Toluene

As in July 1999, toluene was not detected in any of the wells during the October 1999 event.

Significant toluene concentrations were detected during July 1990 to July 1991 (MW-11), July 1991 to January 1992 (MW-04), July 1992 to July 1993 (MW-09), and July 1994 to January 1995 (MW-09). Concentrations were also detected at location MW-04 during January 1993. Elevated ethylbenzene and total xylene concentrations are generally associated with elevated toluene concentrations.

Ethylbenzene

During the October 1999 sampling round, ethylbenzene was detected in 8 of the 14 wells. Ten wells had detections in the July 1999 sampling, seven of which decreased in the October 1999 sampling. Well MW-11 had the highest concentration (480 µg/L), an increase from 85 µg/L reported in July 1999. Well MW-03 had the second highest concentration (200 µg/L), a significant increase from 1.3 µg/L detected in July 1999. Well MW-14S had the third highest concentration of 120 µg/L, a significant decrease from 3,000 µg/L detected in July 1999. The remaining wells with ethylbenzene detections had relatively low concentrations, ranging from 2.9 µg/L in MW-06D to 92 µg/L in MW-04. Only wells MW-01S, MW-01D, MW-07, MW-09, and MW-16 showed no detection of ethylbenzene in October 1999.

Total Xylenes

During the October 1999 sampling round, total xylenes were detected in 2 of the 14 wells. Well MW-04 had a total xylenes concentration of 11 µg/L, a decrease from 56 µg/L in July 1999. Well MW-11 had a concentration of 52 µg/L, an increase from a not detected result in July 1999.

6.3 Inorganic and Miscellaneous Parameters

Table 6-4 shows the analytical results for inorganic parameters (cadmium, total and hexavalent chromium, copper, and pH) during the October 1999 sampling event.

Hexavalent Chromium (Cr⁶⁺)

During the October 1999 sampling, hexavalent chromium was detected in seven wells. Well MW-04 had a concentration of 58.2 mg/L, which is an increase from 17.1 mg/L in October 1999. Detectable concentrations of hexavalent chromium ranged from 0.014 mg/L in MW-10ID and

MW-15S to 0.057 mg/l in MW-11. Concentrations of hexavalent chromium increased in six of the seven wells. Figure 6-4 shows the concentration of hexavalent chromium detected in the shallow wells during the October 1999 sampling.

The water purged from MW-04 has typically been bright yellow in color since CDM began sampling the wells on a quarterly basis in January 1989. During the July 1999 sampling round, the color of water from MW-04 was again noted as yellow. The color of the water from MW-09 has periodically been noted as yellow. However, the water from MW-09 was clear during the October 1999 sampling. Figure 6-5 shows the concentrations of hexavalent chromium and groundwater elevations in MW-04 over time.

The concentrations of hexavalent chromium at MW-04 decreased from July 1989 (120 mg/L) to July 1993 (1.8 mg/L), while groundwater elevations increased. Since July 1993, hexavalent chromium concentrations have fluctuated up and down while groundwater elevations have remained fairly constant. Historically, hexavalent chromium has been detected in four wells other than MW-04, although the highest concentration has always been detected at MW-04. At MW-14S from October 1990 to January 1993, hexavalent chromium concentrations generally decreased, with analytical non-detections reported for the last six sampling rounds previous to October 1994 and eight of the last 14 sampling rounds since then. Since October 1996 results from six of the 13 sampling rounds indicate detectable concentrations of hexavalent chromium. In MW-09, hexavalent chromium concentrations decreased between October 1989 and January 1991 and except for a trace amount detected in October 1991. Then between January 1992 and July 1998 hexavalent chromium concentrations were not detected above the reported detection limits. Between October 1998 and October 1999 results for four of the five sampling events indicated detectable concentrations of hexavalent chromium. A trace level of hexavalent chromium was detected in MW-15S for the first time during the January 1995 sampling event and was detected again in January 1999 and during this sampling event trace levels of hexavalent chromium were also detected in MW-11 during the January 1992 and the October 1999 sampling event at concentrations of 0.10 and 0.057 mg/L, respectively.

Total Chromium (Cr[T])

Total chromium was detected above the detection limit in five monitoring wells during the October 1999 sampling event. The highest concentration was detected in well MW-04 at a concentration of 105 mg/L, which is an increase of 55.3 mg/L in October 1999. The remaining wells with total chromium detections had concentrations ranging from 0.015 mg/L in MW-15S to 4.2 mg/L in MW-09. Figure 6-6 shows the concentrations of total chromium detected in shallow monitoring wells during October 1999. Figure 6-7 shows the concentrations of total chromium and corresponding groundwater elevations in MW-04 over time.

TABLE 6-4
PHIBRO-TECH, INC.
October 1999 Quarterly Monitoring Well Sampling
Inorganic Analytical Results
(mg/L)

Well Identification	Cadmium	Chromium (Hexavalent)	Chromium (Total)	Copper	pH
	EPA- 6010B	EPA- 7196A	EPA- 6010B	EPA- 6010B	EPA- 150.1
PTI- MW01S	ND < 0.0050	ND < 0.010	ND < 0.010	ND < 0.025	6.8
PTI- MW01D	ND < 0.0050	0.014	ND < 0.010	ND < 0.025	7.2
PTI- MW03	ND < 0.0050	ND < 0.010	ND < 0.010	ND < 0.025	7.1
PTI- MW04	0.59	58.2	105	ND < 0.075	6.5
PTI- MW04A	ND < 0.0050	0.017	ND < 0.010	ND < 0.025	7.1
PTI- MW06B	ND < 0.0050	ND < 0.010	ND < 0.010	ND < 0.025	7.2
PTI- MW06D	ND < 0.0050	ND < 0.010	ND < 0.010	ND < 0.025	7.3
PTI- MW07	ND<0.0050	ND < 0.010	ND < 0.010	0.071	6.8
PTI- MW09	ND < 0.0050	4.0	4.2	ND < 0.025	6.9
PTI- MW11	ND < 0.0050	0.057	0.020	ND < 0.025	7.0
PTI- MW14S	0.0060	0.035	0.15	0.044	6.8
PTI- MW15S	ND < 0.0050	0.014	0.015	ND < 0.025	7.2
PTI- MW15D	ND < 0.0050	ND < 0.010	ND < 0.010	ND < 0.025	7.4
PTI- MW16	ND < 0.0050	ND < 0.010	ND<0.010	ND < 0.025	6.7
MCL	0.005	NE	0.05	1.3*	NE
SGV GW	ND	ND	ND	ND - 0.67	7.0 - 8.5

mg/L - milligrams per liter

ND = Analytical parameter not detected.

NA = Parameter not analyzed

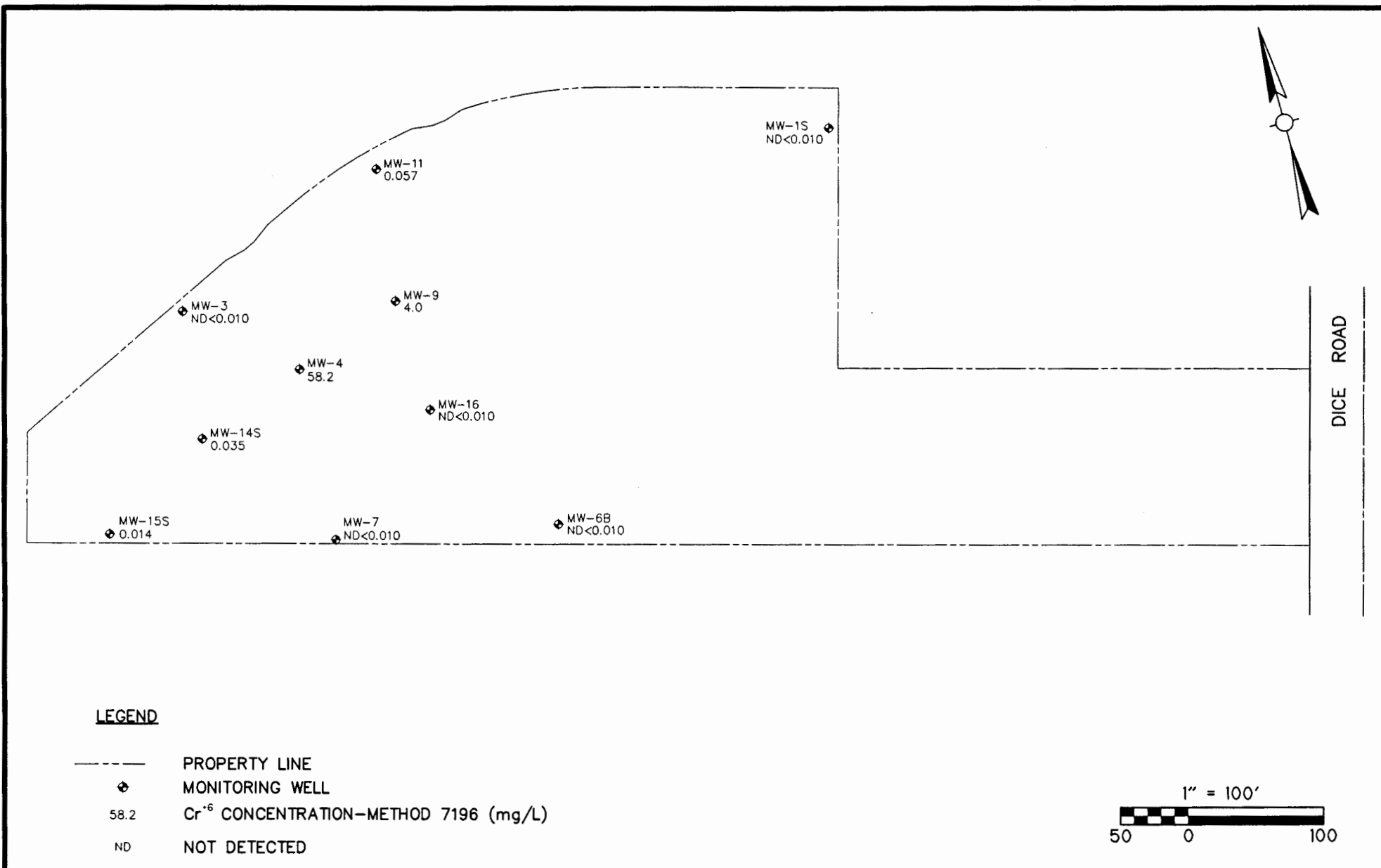
MW = Monitoring Well

MCL = Maximum Contaminant Limit

SGV GW = Range of concentrations in water supply wells tested in the Santa Fe Springs area in the year 1996.

NE = Not established

* California Drinking Water Action Level

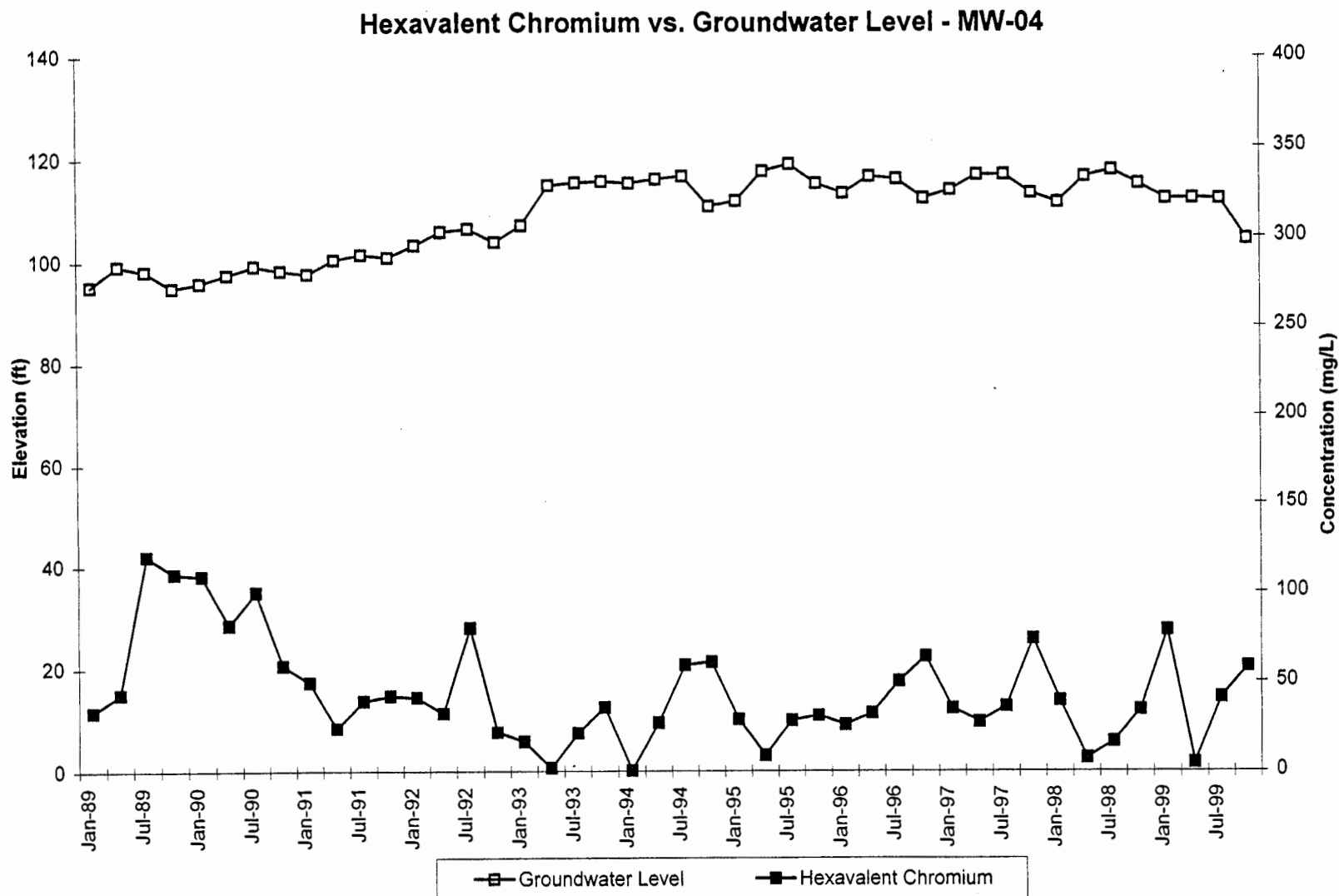


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Hexavalent Chromium Concentrations - Shallow Wells October 1999

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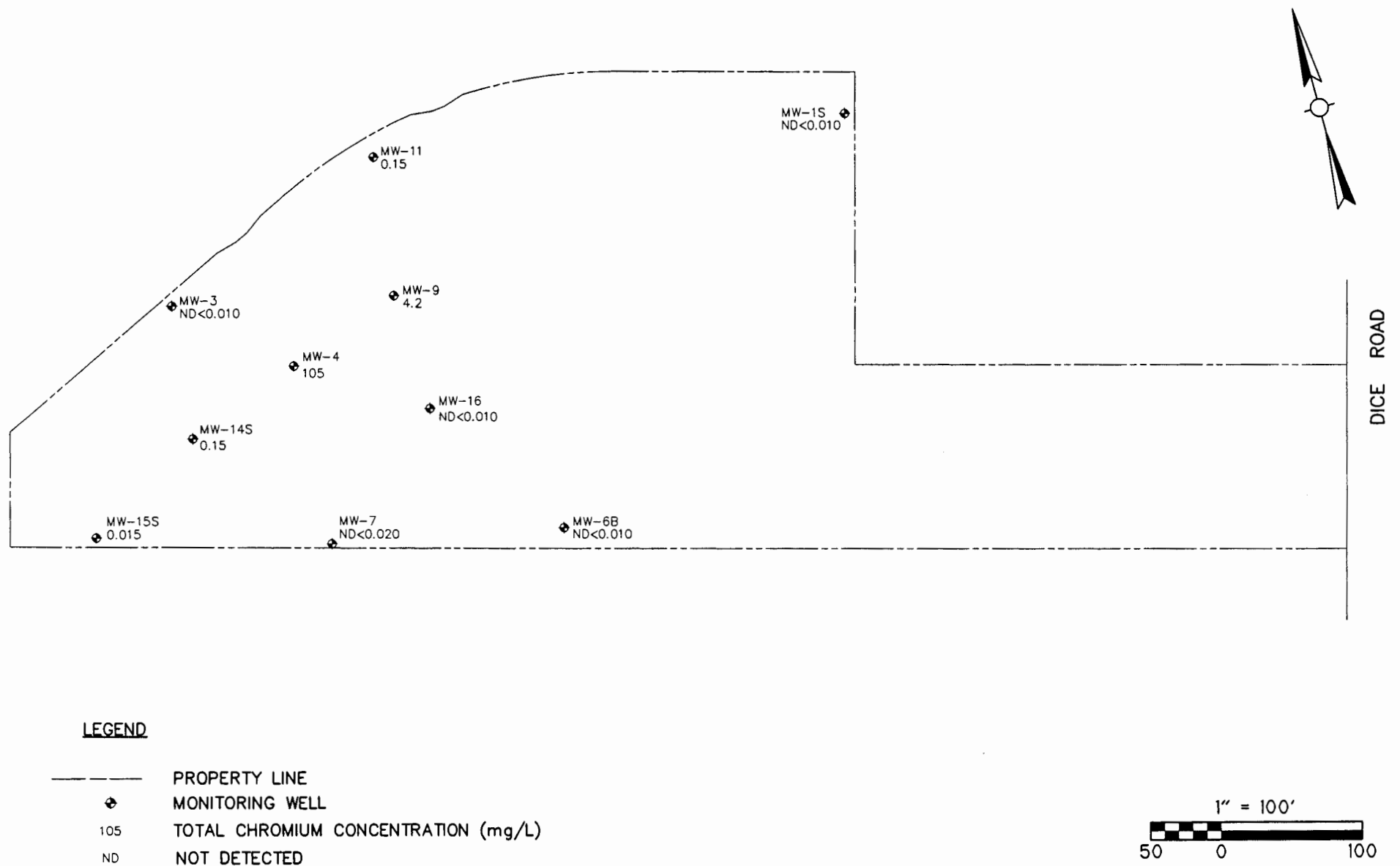


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Hexavalent Chromium Concentrations - Groundwater Elevations
MW-04
January 1989 - October 1999

CDM

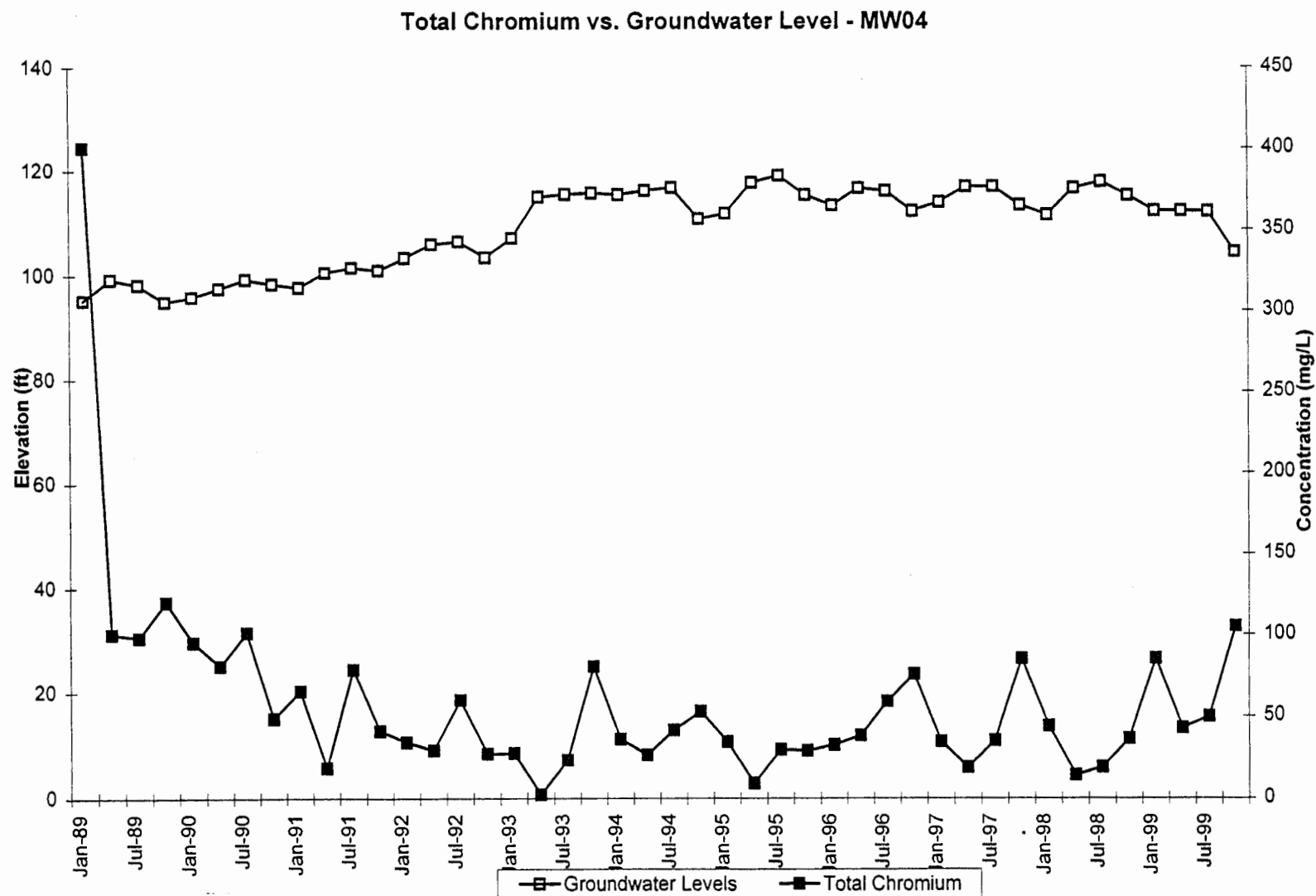
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Total Chromium Concentrations - Shallow Wells October 1999

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Total Chromium Concentrations - Groundwater Elevations
MW-04
January 1989 - October 1999

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Comparison of historical total chromium data with present data (Table 6-1) indicates that total chromium concentrations, like those of hexavalent chromium, generally decreased from January 1989 to July 1993, and have fluctuated up and down since July 1993. Historically, the highest total chromium concentrations have been detected in MW-04. Sporadic detections of total chromium close to the detection limit have occurred historically in nearly all shallow wells on site.

Cadmium (Cd)

During the October 1999 sampling event, cadmium was detected in two on-site wells at a concentration greater than the MCL of 0.005. Well MW-04 had a concentration of 0.59 mg/L, a slight increase from 0.42 mg/L in July 1999.

Previous concentrations in MW-04 have ranged from 0.028 mg/L in January 1989 to 0.86 mg/L in July 1992. Figure 6-8 shows the cadmium concentrations detected in the on-site wells during October 1999. Figure 6-9 shows the concentrations in MW-04 of cadmium and corresponding groundwater elevations in MW-04 over time. As groundwater elevations have generally increased since January 1989, cadmium concentrations have also generally increased. As shown on the figure, cadmium concentrations have fluctuated considerably (i.e., from non-detectable at a detection limit of 0.005 mg/L during July 1993 to 0.86 mg/L during July 1992) since July 1990. Cadmium concentrations in MW-04 have been fluctuating since October 1997 to the present sampling event.

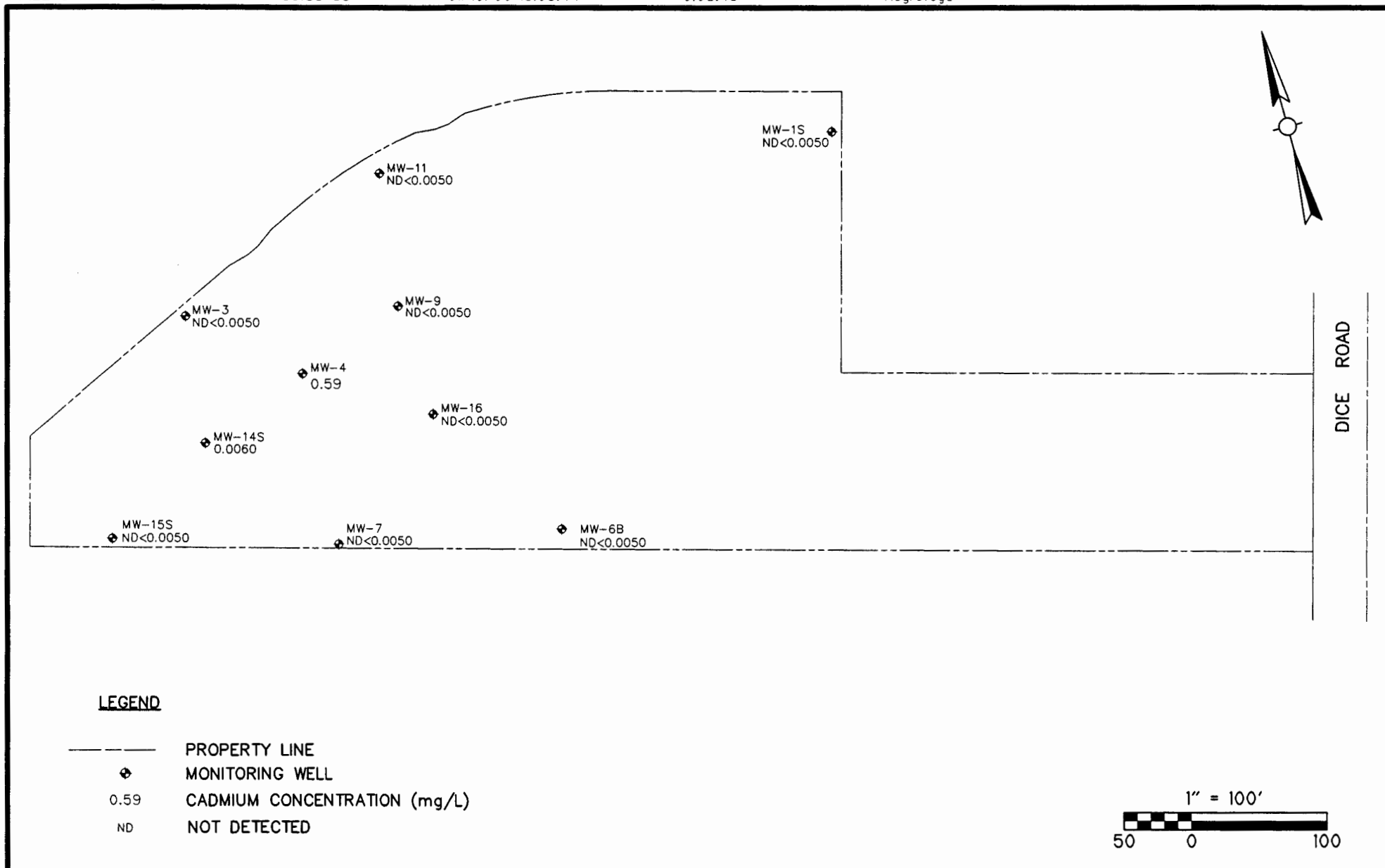
Cadmium has been consistently detected consistently only in well MW-04. Historically, cadmium has been detected at concentrations of 0.01 mg/L in MW-01 during July 1989, 0.005 to 0.018 mg/L in MW-14S during October 1990 through July 1991, 0.0055 mg/L in MW-14S during July 1995, and in MW-15S at low concentrations close to the detection limit from July 1991 to January 1993. Detected concentrations in MW-15S ranged from 0.005 mg/L in July 1992 to 0.02 mg/L during October 1991.

Copper (Cu)

Copper was detected in two wells (MW-07, and MW-14S), during October 1999. None of the wells had copper concentrations above the secondary MCL of 1.0 mg/L. The highest concentration was in well MW-07 at 0.071 mg/L, which was an increase from 0.068 mg/L in July 1999. Figure 6-10 shows the copper concentrations detected in the on-site wells during October 1999. Historically, with the exception of well MW-14S, elevated concentrations of copper above the MCL have not been detected in on-site monitoring wells.

pH

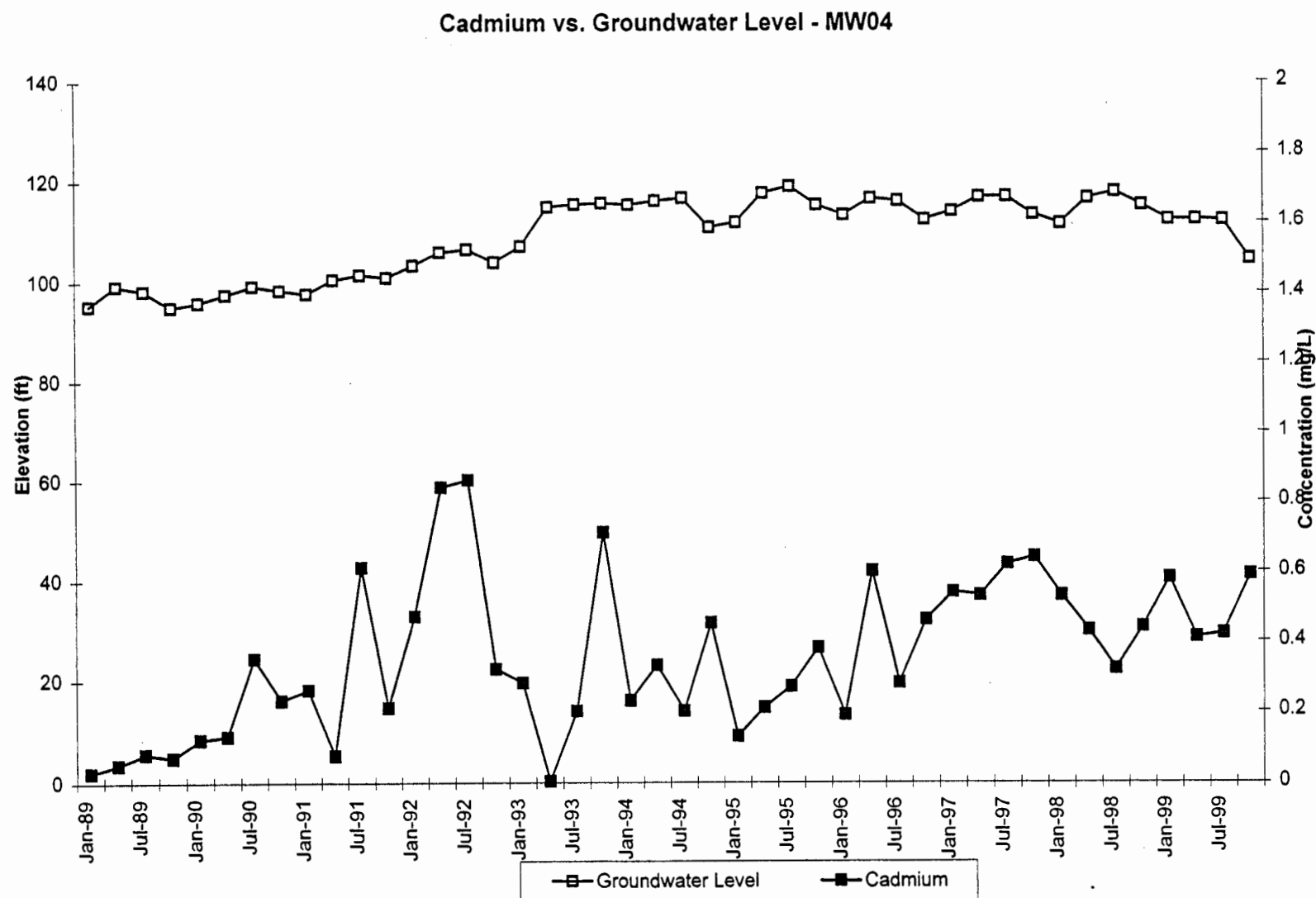
Groundwater samples from all wells were measured for pH in the field during purging activities and also by the analytical laboratory on the samples submitted for analysis. Field pH measurements were recorded in the field log book during well purging. In October 1999, the field measurements of pH generally correlated with the values shown in Table 6-4, which range from 6.5 to 7.4.



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Cadmium Concentrations - Shallow Wells October 1999

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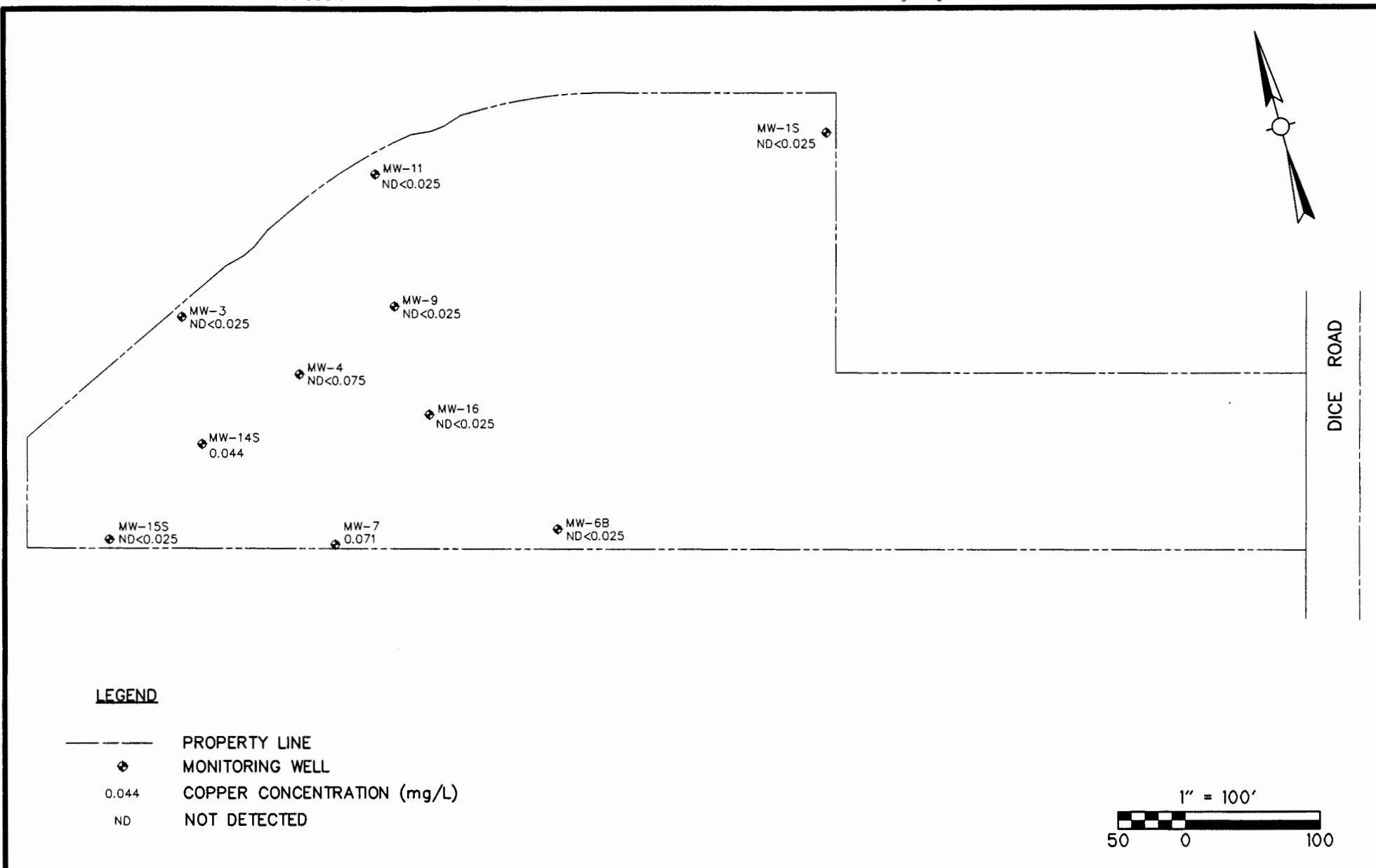


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**Cadmium Concentrations - Groundwater Elevations
MW-04
January 1989 - October 1999**

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Copper Concentrations - Shallow Wells

October 1999

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Section 7

Statistical Evaluation

The following sections contain a statistical treatment of the monitoring data designed to determine if onsite wells have been impacted by metals, BTEX compounds (benzene, toluene, ethylbenzene, xylenes) or TCE (trichloroethene). The procedures used are based on the recommendations provided in the 1989 EPA Guidance document, Statistical Analysis of Ground-water Monitoring Data at RCRA Facilities - Interim Final Guidance and in the 1992 Addendum document. In some instances, methods which have not been recommended in the documents cited above were used. However, unrecommended techniques were only used to supplement the recommended procedures. When statistical methods outlined in the 1989 guidance document were superseded by the 1992 Addendum, the more recent recommendations were followed.

7.1 Determination of Background Upper Tolerance Limit

Overview

The upper tolerance limit (UTL) is a method that is typically used in compliance monitoring to compare downgradient wells to established maximum contaminant levels (MCLS) or alternate contaminant levels (ACLs). In short, the UTL represents the upper end of the tolerance interval, which is calculated at a specified confidence level and coverage. For instance, a UTL with 95 percent coverage and a 95 percent confidence level represents a value which, with 95 percent confidence, will be exceeded less than 5 percent of the time.

In the present evaluation, we have calculated UTLs for the background well (MW-1S) and compared this value to each individual downgradient analytical result using a confidence level and coverage of 95 percent. When onsite wells exceed the background UTL consistently, it suggests that a significant difference from background may exist. While this is not a recommended technique for detection monitoring, we have applied background UTLs as a screening tool and as a supplement to the more rigorous statistical comparisons that follow.

Methods

Inherent in the calculation of a parametric UTL is the assumption of a normal (or log normal) data distribution. One of the tests for normality recommended in the 1992 Addendum to the EPA guidance document is the probability plot. When a data set is normally distributed, the corresponding probability plot is linear. However, for the background well, the analyses have a high percentage of nondetects for most parameters. Therefore, the probability plots appear to be nonlinear (see Appendix E-3). Fortunately, several methods are available to adjust the mean and standard deviation (used in the calculation of the UTL) based on various treatment of nondetects that allow the use of a parametric UTL. In a parametric UTL, the magnitude of the analyses are considered, while in a nonparametric analysis, the data is ranked from highest to lowest and the UTL is calculated from the ranks. The choice of method depends on the percentage of nondetects in the population and on comparison of special probability plots designed to test the assumptions built into each model. Parametric methods for determination of the UTL are described below. When the percentage of nondetects is above 90 percent, the

UTL is calculated using a nonparametric method employing the Poisson model. In the Poisson model, detected values are treated as "rare events," such that the probability of occurrence is low, but constant. The model takes into account both the frequency of occurrence of detected values as well as the magnitude. Since the Poisson model is nonparametric, a normal or log normal data distribution is not required.

When the frequency of detect is greater than 10 percent and data are normally or log normally distributed, either the Atchison or Cohen adjustment is recommended. In the Atchison method, nondetects are assumed to equal zero, and therefore are not considered in the data distribution. In the Cohen adjustment, nondetects are assumed to have finite values between zero and the detection limit. Experience at EPA and USGS (EPA 1992) have shown that, in general, when the frequency of detect (FOD) is between 10 and 50 percent, Atchison's method is more valid; while between 50 and 90 percent FOD, Cohen's method is more valid. However, this is only a rule of thumb that should be verified periodically using the detects-only and censored probability plot method described above.

Results

The frequencies of detection for each parameter in the background well (MW-1S) is provided in Table 7-1. For hexavalent chromium, cadmium, and benzene, the FOD was less than 10 percent and the Poisson nonparametric method was used to calculate the UTL. Total chromium, copper, toluene, ethylbenzene, and total xylenes analyses were all between 10 and 50 percent FOD, suggesting that the Atchison adjustment should be employed before calculating the UTL. For trichloroethene (TCE), the data were both normally and log normally distributed (see Appendices E-2 and E-3) and the FOD was 100 percent; therefore, no adjustment was required, and the UTL was calculated directly.

The results of the UTL calculations and the comparison with each onsite well are presented in Table 7-2. Based on the number of analyses above the UTL for each onsite well, MW-3, MW-4, MW-7, MW-9, MW-11, and MW-16 appear to differ from background with respect to the BTEX compounds. MW-4, MW-7, MW-11, and MW-14S also appear to differ from background with respect to total chromium and copper. Note that the comparison of background UTLs to onsite wells described above is not definitive and will only be used in conjunction with the more in-depth statistical approaches that follow.

7.2 Comparison of Background and Onsite Wells

Overview

The recommended method for comparing onsite wells to background is the analysis of variance (ANOVA). There are two types of ANOVA (parametric and nonparametric). In order to use the parametric ANOVA, the data set must be normally or log normally distributed and the group variances must be equal. For the nonparametric approach, neither normality or equal variances are required, however, slightly larger datasets are needed to use a nonparametric method compared to the parametric ANOVA. The minimum number of analyses for the nonparametric test is 9, while for the parametric test, only 6 are required (EPA 1989).

Table 7-1
Percent of Total Samples in Shallow Wells Reported Above the Detection Limit
Quarterly Data: January 1989 to October 1999 at Philbro-Tech, Inc.

Parameter	MW-1S	MW-3	MW-4	MW-6B	MW-7	MW-9	MW-11	MW-14S	MW-15S	MW-16
Number Samples (n)	44	44	44	40	44	43	44	36	37	31
Metals (mg/L) (%)										
Hexavalent chromium	2.3	2.3	100.0	0	2.3	27.3	4.6	50.0	8.1	0
Total chromium	11.4	6.8	97.7	27.5	20.4	38.6	13.6	80.6	37.8	6.4
Cadmium	2.3	0	97.7	0	4.6	4.6	0	19.4	18.9	0
Copper	25.0	11.4	31.8	5.0	45.4	11.4	25.0	55.6	13.5	16.1
Aromatics (µg/L) (%)										
Benzene	2.3	11.4	18.2	0	20.4	6.8	0	16.7	0	0
Toluene	9.3	16.3	34.9	41.0	16.3	37.2	44.2	20.0	27.8	20.0
Ethylbenzene	29.6	54.6	86.4	47.5	45.4	68.2	87.5	77.8	59.5	80.6
Total xylenes	31.8	40.9	86.4	47.5	34.1	56.8	72.7	61.1	56.8	48.4
Halocarbons (µg/L) (%)										
Trichloroethene	100.0	97.7	93.2	100.0	100.0	93.2	95.4	100.0	97.3	100.0

% = Percent detected

Table 7-2
Definition of Upper Tolerance Levels in Background Shallow Wells
Quarterly Data: January 1989 to October 1999 at Philbro-Tech, Inc.

Parameter	% Detected in Bkgd ¹	Tolerance Limit Method	Upper Tolerance Limit ²	Upper Tolerance Limit Exceeded								
				MW-3 44 ³	MW-4 44	MW-6B 40	MW-7 44	MW-9 43	MW-11 44	MW-14S 36	MW-15S 37	MW-16 31
Metals (mg/L)												
Hexavalent chromium	2.3	P	1.00	1	42 ⁴	-	-	6	-	1	-	-
Total chromium	11.4	A	0.046	2	44 (1)	1	2	15	-	15 (1)	-	-
Cadmium	2.3	P	0.5	-	12	-	-	-	-	-	-	-
Copper	25.0	A	0.032	4 (1)	11 (4)	3 (1)	15 (2)	4 (1)	8 (1)	12	4	3
Aromatics (µg/L)												
Benzene	2.3	P	19.5	3 (3) ⁵	8 (7)	1 (1)	5 (4)	14 (14)	6 (6)	1 (1)	(1)	3 (3)
Toluene	9.3	A	1.31	16 (9)	35 (20)	14 (1)	13 (8)	33 (17)	34 (15)	12 (7)	11 (2)	19 (14)
Ethylbenzene	29.6	A	2.35	16 (3)	39 (2)	14 (1)	16 (4)	36 (7)	39 (3)	25	20	26 (3)
Total xylenes	31.8	A	4.94	15 (5)	41 (4)	15	11 (4)	35 (11)	31 (6)	17 (2)	11	15 (7)
Halocarbons (µg/L)												
Trichloroethene	100.0	T	20.88	34 (1)	44 (3)	42	39	39 (3)	42	32	2	29

¹ MW-1S is background shallow well, n = 44

² In ppm or ppb, as noted for groups

³ Number of samples collected at corresponding well

⁴ Number of samples that exceed upper tolerance level at corresponding well

⁵ (6) number of samples exceeding limit that are reported as ND

- = None of samples exceeded the upper tolerance limit

P = Poisson

A = Atchison adjusted

T = Unadjusted limit

The first assumption (normal or log normal distribution) should be tested using either the Shapiro-Wilk or probability plot method when the sample size is 50 or less. In general, the Shapiro-Wilk test is much more stringent than the probability plot since the method tends to focus on the "tails" of the distribution. The Lillifors, while not recommended in the Addendum, was suggested in the Interim Final Guidance (EPA 1989) and has been included for comparative purposes.

The test for equal group variances suggested in the Addendum to the Interim Final Guidance (EPA 1992) is the box plot. In a box plot, the extent of each box represent the 25th and 75th percentiles of the data set. Therefore, a long box tends to represent a larger variance than a short box. EPA (1992) recommends using a nonparametric ANOVA if the length of the largest box is equal to or greater than three times that of the smallest box. Another suggested criteria for a parametric ANOVA is a combined FOD, for both the background and the onsite well under consideration, of greater than 50 percent.

Methods

Normality tests were performed only for TCE, since for the other parameters, the combined FOD was <50 percent, precluding the use of the parametric ANOVA method. Results of the probability plot, and Shapiro-Wilk tests are presented in Table 7-3, while the raw data are in Appendices E-2 and E-3, respectively. Due to the stringent nature of the Shapiro-Wilk test, less weight was given to this test than the probability plots when conflicting results were obtained. Based on Table 7-3, the TCE data are either normal or log normal in all wells except MW-3, MW-6B, MW-9, and MW-7. The log normal data distribution is typical of environmental datasets where various degrees of dilution have occurred. The lack of normality or log normality precluded the use of a parametric ANOVA for wells MW-3 MW-6B, MW-7, and MW-9.

In order to test the equal group variances assumption, box plots were constructed for TCE in each well (see Appendix E-4). The results indicate that the background box is less than • the length of the box for well MW-6B, indicating that this well cannot be compared to background using a parametric ANOVA. However, all other wells met the equal variance requirement.

A summary of the ANOVA method used is as follows:

- MW-4, MW-11, MW-14S, MW-15S, and MW-16 for TCE — parametric ANOVA using ½ D.L. for nondetects
- All other parameters and wells — nonparametric, Kruskal Wallis Mann Whitney U Test

Note that ½ D.L. was used when the FOD was greater than 85 percent in a single well.

Results

The results of the nonparametric and parametric ANOVA tests are included in Appendices E-5 and E-6, respectively, while a summary is provided in Table 7-4. An "R" indicates that the null hypothesis was rejected, or that the two wells are not the same, while an "A" indicates the null hypothesis was accepted. In general, the results are similar to the UTL comparisons with the exception of the following: MW-16 appears to differ from background with respect to the BTEX

Table 7-3 Summary of the Data Distribution for Shallow Wells Using Three Different Methods Quarterly Data: January 1989 to October 1999 at Philbro-Tech, Inc.			
Well	Parameter	With NDs	
		P Plot	Shapiro-Wilk
MW-1S	Copper	R	R
MW-1S	Ethylbenzene	R	R
MW-1S	Total chromium	R	R
MW-1S	Toluene	R	R
MW-1S	Total xylenes	R	R
MW-1S	TCE	N/L	R
MW-11	TCE	L	R
MW-14S	TCE	L	R
MW-15S	TCE	L	R
MW-16	TCE	L	R
MW-3	TCE	R	R
MW-4	TCE	N	R
MW-6B	TCE	R	R
MW-7	TCE	R	R
MW-9	TCE	R	R

MW-1S = Background shallow well

L = Lognormal

N = Normal

R = Neither normal or lognormal

N/L = Normal or lognormal distribution can be used

Table 7-4
Comparison of Background and Onsite Shallow Wells
Quarterly Data: January 1989 to October 1999 at Phibro-Tech, Inc.

Parameter	MW-3	MW-4	MW-6B	MW-7	MW-9	MW-11	MW-14S	MW-15S	MW-16
Metals (mg/L)									
Hexavalent chromium ¹	A	R	A	A	R	A	R	A	A
Total chromium ¹	A	R	R	A	R	A	R	A	A
Cadmium ¹	A	R	A	A	A	A	A	A	A
Copper ¹	A	A	A	A	A	A	R	A	A
Aromatics (µg/L)									
Benzene ¹	R	R	A	R	R	R	R	A	R
Toluene ¹	R	R	R	R	R	R	R	A	R
Ethylbenzene ¹	R	R	R	R	R	R	R	R	R
Total xylenes ¹	R	R	A	A	R	R	R	A	R
Halocarbons (µg/L)									
Trichloroethene ²	R ³	R ⁴ /R ⁵	A ³	R ³	R/R	R ³	R/R	R/R	R/R

¹ Background to onsite comparison by Mann Whitney U Method, using D.L. for ND, at 95 percent confidence level

² Background to onsite comparison by one way ANOVA Method using ½ D.L. for ND

³ Nonparametric comparison used for TCE

⁴ Normal Distribution used in comparison

⁵ Log normal Distribution used in comparison

A Null Hypothesis, that means are equal, is accepted

R Null Hypothesis, that means are equal, is rejected

R/R Null Hypothesis, rejected using parametric (top letter) and nonparametric (bottom letter) tests

compounds; MW-4, MW-7, MW-11 do not differ from background with respect to copper; MW-6B appears to differ from background with respect to total chromium; and MW-14S appears to differ from background with respect to hexavalent chromium. The results for TCE were obtained using both the normal and log normal assumptions for comparative purposes. The results indicate that, regardless of the data distribution, only well MW-6B was the same as background with respect to TCE. No changes have occurred since last quarter.

Section 8

Assessment of Quarterly Groundwater Monitoring Program Status

In the October 1990 groundwater monitoring report, changes in the quarterly groundwater sampling program were proposed. These changes were first implemented during the April 1991 sampling event and included reducing the number of wells sampled and parameters analyzed in each well. The current groundwater sampling program will only be used as an interim groundwater sampling program, until a remediation alternative from the Corrective Measures Study (CMS) has been selected by EPA. Existing data is currently being evaluated to determine whether the sampling frequency can be modified from quarterly to semi-annually.

The analytical parameters for the October 1999 quarterly monitoring were as follows:

<i>Wells</i>	<i>Purgeable Halogenated/ Aromatic Organics (EPA 8260)</i>	<i>Chromium, Cadmium, Copper</i>	<i>Hexavalent Chromium</i>	<i>pH</i>
MW-01S, MW-01D	X	X	X	X
MW-03, MW-04A	X	X	X	X
MW-11 MW-06B	X	X	X	X
MW-06D, MW-07	X	X	X	X
MW-09, MW-04	X	X	X	X
MW-14S, MW-15S	X	X	X	X
MW-15D, MW-16	X	X	X	X

Beginning with the January 1997 sampling event, EPA Method 8010/8020 was replaced with EPA Method 8260. This change was requested by the analytical laboratory, which no longer performs 8010/8020 analysis. Methyl tertiary butyl ether (MTBE) analysis was performed once, in January 1997. Since there were no detections of MTBE in any of the groundwater samples, this analysis was discontinued.

Statistical analysis was historically conducted annually. Beginning with the October 1993 sampling event, statistical analysis has been performed on a quarterly basis, as requested by DTSC.

The proposed January 2000 quarterly monitoring includes sampling the 14 wells for purgeable halogenated/aromatic organics using EPA Method 8260, chromium, cadmium, copper, hexavalent chromium, and pH. The water levels at the 14 wells sampled, in addition to the remaining unsampled wells, will also be measured.

Section 9

References

Camp Dresser & McKee Inc., Groundwater Modeling Study, Southern California Chemical, January 1993.

_____, RCRA Facility Investigation Work Plan Addendum, Southern California Chemical, February 13, 1992, Revised March 6, 1992.

_____, RCRA Facility Investigation Report, Southern California Chemical, December 6, 1991.

_____, RCRA Facility Investigation Work Plan, Southern California Chemical, June 26, 1990.

_____, Current Conditions Report, Southern California Chemical, June 8, 1990.

City of Santa Fe Springs, 1996 Annual Water Quality Report, 1996.

J.H. Kleinfelder & Associates, Quality Assurance Project Plan, Southern California Chemical, May 1988.

_____, Draft Environmental Assessment, Southern California Chemical, January 1986.

Appendix A
General Analytical Detection Limits

TABLE A-1
PHIBRO-TECH, INC.
HEAVY METALS AND INORGANICS ANALYSIS
Typical Detection Limits

Method Number	Analytical Parameter	Detection Limit	Units
EPA 6010-L	Antimony	0.06	mg/L
EPA 6010-L	Barium	0.01	mg/L
EPA 6010-L	Beryllium	0.002	mg/L
EPA 6010-L	Cadmium	0.005	mg/L
EPA 6010-L	Chromium	0.01	mg/L
EPA 6010-L	Cobalt	0.01	mg/L
EPA 6010-L	Copper	0.02	mg/L
EPA 6010-L	Lead	0.05	mg/L
EPA 6010-L	Molybdenum	0.02	mg/L
EPA 6010-L	Nickel	0.04	mg/L
EPA 6010-L	Silver	0.01	mg/L
EPA 6010-L	Thallium	0.5	mg/L
EPA 6010-L	Tin	0.1	mg/L
EPA 6010-L	Vanadium	0.01	mg/L
EPA 6010-L	Zinc	0.02	mg/L
EPA 7196	Chromium, Hexavalent	0.02	mg/L
EPA 7061-L	Arsenic	0.005	mg/L
EPA 9012	Cyanide, Total	0.01	mg/L
EPA 7470	Mercury	0.001	mg/L
EPA 300.0	Chloride	5	mg/L
EPA 300.0	Nitrate	0.2	mg/L
EPA 7741-L	Selenium	0.1	mg/L
EPA 376.2	Sulfide, as Sulfur	1.2	mg/L

TABLE A-2
PHIBRO-TECH, INC.
VOLATILE ORGANIC COMPOUNDS
Typical Detection Limits

Method Number	Analytical Parameter	Detection Limit	Units
EPA 8260	Benzene	0.5	µg/L
EPA 8260	Toluene	1.0	µg/L
EPA 8260	Ethylbenzene	1.0	µg/L
EPA 8260	Xylenes, Total	1.0	µg/L
EPA 8260	Chloromethane	1.0	µg/L
EPA 8260	Bromomethane	1.0	µg/L
EPA 8260	Vinyl Chloride	1.0	µg/L
EPA 8260	Chloroethane	1.0	µg/L
EPA 8260	Methylene Chloride	1.0	µg/L
EPA 8260	Trichlorofluoromethane	1.0	µg/L
EPA 8260	1,1-Dichloroethene	1.0	µg/L
EPA 8260	1,1-Dichloroethane	1.0	µg/L
EPA 8260	trans-1,2-Dichloroethene	1.0	µg/L
EPA 8260	Chloroform	1.0	µg/L
EPA 8260	1,2-Dichloroethane	1.0	µg/L
EPA 8260	1,1,1-Trichloroethane	1.0	µg/L
EPA 8260	Carbon Tetrachloride	1.0	µg/L
EPA 8260	Bromodichloromethane	1.0	µg/L
EPA 8260	1,2-Dichloropropane	1.0	µg/L
EPA 8260	trans-1,3-Dichloropropene	1.0	µg/L
EPA 8260	Trichloroethene	1.0	µg/L
EPA 8260	Dibromochloromethane	1.0	µg/L
EPA 8260	1,1,2-Trichloroethane	1.0	µg/L
EPA 8260	cis-1,3-Dichloropropene	1.0	µg/L
EPA 8260	2-Chloroethylvinyl ether	1.0	µg/L
EPA 8260	Bromoform	1.0	µg/L
EPA 8260	Tetrachloroethene	1.0	µg/L
EPA 8260	1,1,2,2-Tetrachloroethane	1.0	µg/L
EPA 8260	Chlorobenzene	1.0	µg/L
EPA 8260	1,2-Dichlorobenzene	1.0	µg/L
EPA 8260	1,3-Dichlorobenzene	1.0	µg/L
EPA 8260	1,4-Dichlorobenzene	1.0	µg/L

Appendix B
Quanterra Analytical Reports

Precis
A Quanterra Product..

Quanterra
1721 South Grand Ave.
Santa Ana, CA 92705

Tel (714) 258-8610
Fax (714) 258-0921

November 5, 1999

QUANTERRA INCORPORATED LOT NUMBER: E9J270242
PO/CONTRACT: 2279-11462-111.FLD

Sharon Wallin
Camp, Dresser, McKee
18881 Von Karman, Suite 650
Irvine, CA 92612

Dear Ms. Wallin,

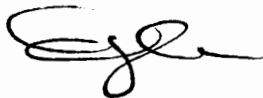
This report contains the analytical results for the 9 samples received under chain of custody by Quanterra Incorporated on October 27, 1999. These samples are associated with your PTI - Santa Fe Springs project.

All applicable quality control procedures met method-specified acceptance criteria.

This report shall not be reproduced except in full, without the written approval of the laboratory.

If you have any questions, please feel free to call me at 714-258-8610.

Sincerely,



Diane Suzuki
Project Manager

cc: Ed Vigil, Phibro Tech, Santa Fe Springs, CA
project file

Laboratory/Client Sample Cross-Reference

Lab Sample ID	Client Sample ID	Date	Matrix
E9J270242-001	PTI-MW1S-045	10/27/99	Water
E9J270242-002	PTI-MW1D-045	10/27/99	Water
E9J270242-003	PTI-MW3-045	10/27/99	Water
E9J270242-004	PTI-MW11-045	10/27/99	Water
E9J270242-005	PTI-MW6B-045	10/27/99	Water
E9J270242-006	PTI-MW6D-045	10/27/99	Water
E9J270242-007	PTI-EB01-045	10/27/99	Water
E9J270242-008	PTI-MW7-045	10/27/99	Water
E9J270242-009	PTI-TB01-045	10/27/99	Water

Client: PHIBRO-TECH, INC.

GC/MS Volatiles

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW1S-045

Lab Sample ID: E9J270242-001

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9301418

Matrix: Water

Units: ug/L

Dil. Factor: 1

Method: 8260B

Preparation: 5030B/8260B

Date Sampled: 10/27/99

Date Prepared: 10/27/99

Date Analyzed: 10/27/99

Analyte	Result	RL	Qualifier
Benzene	ND	1.0	
Bromodichloromethane	ND	1.0	
Bromoform	ND	1.0	
Bromomethane	ND	2.0	
Carbon tetrachloride	ND	1.0	
Chlorobenzene	ND	1.0	
Dibromochloromethane	ND	1.0	
Chloroethane	ND	2.0	
Chloroform	ND	1.0	
Chloromethane	ND	2.0	
1,2-Dichlorobenzene	ND	1.0	
1,3-Dichlorobenzene	ND	1.0	
1,4-Dichlorobenzene	ND	1.0	
1,1-Dichloroethane	1.1	1.0	
1,2-Dichloroethane	1.5	1.0	
1,1-Dichloroethene	ND	1.0	
cis-1,2-Dichloroethene	3.9	1.0	
trans-1,2-Dichloroethene	ND	1.0	
1,2-Dichloropropane	ND	1.0	
cis-1,3-Dichloropropene	ND	1.0	
trans-1,3-Dichloropropene	ND	1.0	
Ethylbenzene	ND	1.0	
Methylene chloride	ND	1.0	
1,1,2,2-Tetrachloroethane	ND	1.0	
Tetrachloroethene	ND	1.0	
Toluene	ND	1.0	
1,1,1-Trichloroethane	ND	1.0	
1,1,2-Trichloroethane	ND	1.0	
Trichloroethene	9.1	1.0	
Trichlorofluoromethane	ND	2.0	
Vinyl chloride	ND	2.0	
m-Xylene & p-Xylene	ND	1.0	
o-Xylene	ND	1.0	
Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	95	70-130	
1,2-Dichloroethane-d4	116	60-140	
Toluene-d8	94	70-130	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW1D-045

Lab Sample ID: E9J270242-002

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9301418

Matrix: Water

Units: ug/L

Dil. Factor: 1

Method: 8260B

Preparation: 5030B/8260B

Date Sampled: 10/27/99

Date Prepared: 10/27/99

Date Analyzed: 10/27/99

Analyte	Result	RL	Qualifier
Benzene	ND	1.0	
Bromodichloromethane	ND	1.0	
Bromoform	ND	1.0	
Bromomethane	ND	2.0	
Carbon tetrachloride	ND	1.0	
Chlorobenzene	ND	1.0	
Dibromochloromethane	ND	1.0	
Chloroethane	ND	2.0	
Chloroform	ND	1.0	
Chloromethane	ND	2.0	
1,2-Dichlorobenzene	ND	1.0	
1,3-Dichlorobenzene	ND	1.0	
1,4-Dichlorobenzene	ND	1.0	
1,1-Dichloroethane	ND	1.0	
1,2-Dichloroethane	ND	1.0	
1,1-Dichloroethene	ND	1.0	
cis-1,2-Dichloroethene	ND	1.0	
trans-1,2-Dichloroethene	ND	1.0	
1,2-Dichloropropane	ND	1.0	
cis-1,3-Dichloropropene	ND	1.0	
trans-1,3-Dichloropropene	ND	1.0	
Ethylbenzene	ND	1.0	
Methylene chloride	ND	1.0	
1,1,2,2-Tetrachloroethane	ND	1.0	
Tetrachloroethene	4.9	1.0	
Toluene	ND	1.0	
1,1,1-Trichloroethane	ND	1.0	
1,1,2-Trichloroethane	ND	1.0	
Trichloroethene	2.0	1.0	
Trichlorofluoromethane	ND	2.0	
Vinyl chloride	ND	2.0	
m-Xylene & p-Xylene	ND	1.0	
o-Xylene	ND	1.0	
Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	96	70-130	
1,2-Dichloroethane-d4	115	60-140	
Toluene-d8	96	70-130	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW3-045

Lab Sample ID: E9J270242-003

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9302413

Matrix: Water

Units: ug/L

Dil. Factor: 5

Method: 8260B

Preparation: 5030B/8260B

Date Sampled: 10/27/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Qualifier
Benzene	ND	5.0	
Bromodichloromethane	ND	5.0	
Bromoform	ND	5.0	
Bromomethane	ND	10	
Carbon tetrachloride	61	5.0	
Chlorobenzene	ND	5.0	
Dibromochloromethane	ND	5.0	
Chloroethane	ND	10	
Chloroform	39	5.0	
Chloromethane	ND	10	
1,2-Dichlorobenzene	ND	5.0	
1,3-Dichlorobenzene	ND	5.0	
1,4-Dichlorobenzene	ND	5.0	
1,1-Dichloroethane	15	5.0	
1,2-Dichloroethane	14	5.0	
1,1-Dichloroethene	23	5.0	
cis-1,2-Dichloroethene	ND	5.0	
trans-1,2-Dichloroethene	ND	5.0	
1,2-Dichloropropane	ND	5.0	
cis-1,3-Dichloropropene	ND	5.0	
trans-1,3-Dichloropropene	ND	5.0	
Ethylbenzene	200	5.0	
Methylene chloride	ND	5.0	
1,1,2,2-Tetrachloroethane	ND	5.0	
Tetrachloroethene	ND	5.0	
Toluene	ND	5.0	
1,1,1-Trichloroethane	ND	5.0	
1,1,2-Trichloroethane	ND	5.0	
Trichloroethene	170	5.0	
Trichlorofluoromethane	ND	10	
Vinyl chloride	ND	10	
m-Xylene & p-Xylene	ND	5.0	
o-Xylene	ND	5.0	

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	111	70-130	
1,2-Dichloroethane-d4	121	60-140	
Toluene-d8	112	70-130	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW11-045

Lab Sample ID: E9J270242-004

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9302413

Matrix: Water

Units: ug/L

Dil. Factor: 10

Method: 8260B

Preparation: 5030B/8260B

Date Sampled: 10/27/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Qualifier
Benzene	ND	10	
Bromodichloromethane	ND	10	
Bromoform	ND	10	
Bromomethane	ND	20	
Carbon tetrachloride	ND	10	
Chlorobenzene	ND	10	
Dibromochloromethane	ND	10	
Chloroethane	ND	20	
Chloroform	18	10	
Chloromethane	ND	20	
1,2-Dichlorobenzene	ND	10	
1,3-Dichlorobenzene	ND	10	
1,4-Dichlorobenzene	ND	10	
1,1-Dichloroethane	110	10	
1,2-Dichloroethane	110	10	
1,1-Dichloroethene	56	10	
cis-1,2-Dichloroethene	21	10	
trans-1,2-Dichloroethene	ND	10	
1,2-Dichloropropane	ND	10	
cis-1,3-Dichloropropene	ND	10	
trans-1,3-Dichloropropene	ND	10	
Ethylbenzene	480	10	
Methylene chloride	ND	10	
1,1,2,2-Tetrachloroethane	ND	10	
Tetrachloroethene	ND	10	
Toluene	ND	10	
1,1,1-Trichloroethane	ND	10	
1,1,2-Trichloroethane	ND	10	
Trichloroethene	650	10	
Trichlorofluoromethane	ND	20	
Vinyl chloride	ND	20	
m-Xylene & p-Xylene	38	10	
o-Xylene	14	10	
Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	111	70-130	
1,2-Dichloroethane-d4	129	60-140	
Toluene-d8	116	70-130	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW6B-045

Lab Sample ID: E9J270242-005

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9302413

Matrix: Water

Units: ug/L

Dil. Factor: 1

Method: 8260B

Preparation: 5030B/8260B

Date Sampled: 10/27/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Qualifier
Benzene	ND	1.0	
Bromodichloromethane	ND	1.0	
Bromoform	ND	1.0	
Bromomethane	ND	2.0	
Carbon tetrachloride	ND	1.0	
Chlorobenzene	ND	1.0	
Dibromochloromethane	ND	1.0	
Chloroethane	ND	2.0	
Chloroform	ND	1.0	
Chloromethane	ND	2.0	
1,2-Dichlorobenzene	ND	1.0	
1,3-Dichlorobenzene	ND	1.0	
1,4-Dichlorobenzene	ND	1.0	
1,1-Dichloroethane	1.5	1.0	
1,2-Dichloroethane	ND	1.0	
1,1-Dichloroethene	1.6	1.0	
cis-1,2-Dichloroethene	ND	1.0	
trans-1,2-Dichloroethene	ND	1.0	
1,2-Dichloropropane	ND	1.0	
cis-1,3-Dichloropropene	ND	1.0	
trans-1,3-Dichloropropene	ND	1.0	
Ethylbenzene	4.8	1.0	
Methylene chloride	ND	1.0	
1,1,2,2-Tetrachloroethane	ND	1.0	
Tetrachloroethene	1.8	1.0	
Toluene	ND	1.0	
1,1,1-Trichloroethane	ND	1.0	
1,1,2-Trichloroethane	ND	1.0	
Trichloroethene	12	1.0	
Trichlorofluoromethane	ND	2.0	
Vinyl chloride	ND	2.0	
m-Xylene & p-Xylene	ND	1.0	
o-Xylene	ND	1.0	
Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	102	70-130	
1,2-Dichloroethane-d4	114	60-140	
Toluene-d8	104	70-130	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW6D-045

Lab Sample ID: E9J270242-006

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9301418

Matrix: Water

Units: ug/L

Dil. Factor: 1

Method: 8260B

Preparation: 5030B/8260B

Date Sampled: 10/27/99

Date Prepared: 10/27/99

Date Analyzed: 10/27/99

Analyte	Result	RL	Qualifier
Benzene	ND	1.0	
Bromodichloromethane	ND	1.0	
Bromoform	ND	1.0	
Bromomethane	ND	2.0	
Carbon tetrachloride	ND	1.0	
Chlorobenzene	ND	1.0	
Dibromochloromethane	ND	1.0	
Chloroethane	ND	2.0	
Chloroform	ND	1.0	
Chloromethane	ND	2.0	
1,2-Dichlorobenzene	ND	1.0	
1,3-Dichlorobenzene	ND	1.0	
1,4-Dichlorobenzene	ND	1.0	
1,1-Dichloroethane	ND	1.0	
1,2-Dichloroethane	ND	1.0	
1,1-Dichloroethene	ND	1.0	
cis-1,2-Dichloroethene	ND	1.0	
trans-1,2-Dichloroethene	ND	1.0	
1,2-Dichloropropane	ND	1.0	
cis-1,3-Dichloropropene	ND	1.0	
trans-1,3-Dichloropropene	ND	1.0	
Ethylbenzene	2.9	1.0	
Methylene chloride	ND	1.0	
1,1,2,2-Tetrachloroethane	ND	1.0	
Tetrachloroethene	ND	1.0	
Toluene	ND	1.0	
1,1,1-Trichloroethane	ND	1.0	
1,1,2-Trichloroethane	ND	1.0	
Trichloroethene	8.8	1.0	
Trichlorofluoromethane	ND	2.0	
Vinyl chloride	ND	2.0	
m-Xylene & p-Xylene	ND	1.0	
o-Xylene	ND	1.0	
Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	96	70-130	
1,2-Dichloroethane-d4	114	60-140	
Toluene-d8	97	70-130	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-EB01-045

Lab Sample ID: E9J270242-007

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9301418

Matrix: Water

Units: ug/L

Dil. Factor: 1

Method: 8260B

Preparation: 5030B/8260B

Date Sampled: 10/27/99

Date Prepared: 10/27/99

Date Analyzed: 10/27/99

Analyte	Result	RL	Qualifier
Benzene	ND	1.0	
Bromodichloromethane	ND	1.0	
Bromoform	ND	1.0	
Bromomethane	ND	2.0	
Carbon tetrachloride	ND	1.0	
Chlorobenzene	ND	1.0	
Dibromochloromethane	ND	1.0	
Chloroethane	ND	2.0	
Chloroform	ND	1.0	
Chloromethane	ND	2.0	
1,2-Dichlorobenzene	ND	1.0	
1,3-Dichlorobenzene	ND	1.0	
1,4-Dichlorobenzene	ND	1.0	
1,1-Dichloroethane	ND	1.0	
1,2-Dichloroethane	ND	1.0	
1,1-Dichloroethene	ND	1.0	
cis-1,2-Dichloroethene	ND	1.0	
trans-1,2-Dichloroethene	ND	1.0	
1,2-Dichloropropane	ND	1.0	
cis-1,3-Dichloropropene	ND	1.0	
trans-1,3-Dichloropropene	ND	1.0	
Ethylbenzene	ND	1.0	
Methylene chloride	ND	1.0	
1,1,2,2-Tetrachloroethane	ND	1.0	
Tetrachloroethene	ND	1.0	
Toluene	ND	1.0	
1,1,1-Trichloroethane	ND	1.0	
1,1,2-Trichloroethane	ND	1.0	
Trichloroethene	ND	1.0	
Trichlorofluoromethane	ND	2.0	
Vinyl chloride	ND	2.0	
m-Xylene & p-Xylene	ND	1.0	
o-Xylene	ND	1.0	
Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	95	70-130	
1,2-Dichloroethane-d4	114	60-140	
Toluene-d8	96	70-130	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW7-045

Lab Sample ID: E9J270242-008

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9302413

Matrix: Water

Units: ug/L

Dil. Factor: 2

Method: 8260B

Preparation: 5030B/8260B

Date Sampled: 10/27/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Qualifier
Benzene	ND	2.0	
Bromodichloromethane	ND	2.0	
Bromoform	ND	2.0	
Bromomethane	ND	4.0	
Carbon tetrachloride	ND	2.0	
Chlorobenzene	ND	2.0	
Dibromochloromethane	ND	2.0	
Chloroethane	ND	4.0	
Chloroform	2.7	2.0	
Chloromethane	ND	4.0	
1,2-Dichlorobenzene	ND	2.0	
1,3-Dichlorobenzene	ND	2.0	
1,4-Dichlorobenzene	ND	2.0	
1,1-Dichloroethane	71	2.0	
1,2-Dichloroethane	7.0	2.0	
1,1-Dichloroethene	18	2.0	
cis-1,2-Dichloroethene	35	2.0	
trans-1,2-Dichloroethene	5.7	2.0	
1,2-Dichloropropane	ND	2.0	
cis-1,3-Dichloropropene	ND	2.0	
trans-1,3-Dichloropropene	ND	2.0	
Ethylbenzene	ND	2.0	
Methylene chloride	ND	2.0	
1,1,2,2-Tetrachloroethane	ND	2.0	
Tetrachloroethene	ND	2.0	
Toluene	ND	2.0	
1,1,1-Trichloroethane	ND	2.0	
1,1,2-Trichloroethane	ND	2.0	
Trichloroethene	130	2.0	
Trichlorofluoromethane	ND	4.0	
Vinyl chloride	ND	4.0	
m-Xylene & p-Xylene	ND	2.0	
o-Xylene	ND	2.0	

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	109	70-130	
1,2-Dichloroethane-d4	122	60-140	
Toluene-d8	113	70-130	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-TB01-045

Lab Sample ID: E9J270242-009

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9301418

Matrix: Water

Units: ug/L

Dil. Factor: 1

Method: 8260B

Preparation: 5030B/8260B

Date Sampled: 10/27/99

Date Prepared: 10/27/99

Date Analyzed: 10/27/99

Analyte	Result	RL	Qualifier
Benzene	ND	1.0	
Bromodichloromethane	ND	1.0	
Bromoform	ND	1.0	
Bromomethane	ND	2.0	
Carbon tetrachloride	ND	1.0	
Chlorobenzene	ND	1.0	
Dibromochloromethane	ND	1.0	
Chloroethane	ND	2.0	
Chloroform	ND	1.0	
Chloromethane	ND	2.0	
1,2-Dichlorobenzene	ND	1.0	
1,3-Dichlorobenzene	ND	1.0	
1,4-Dichlorobenzene	ND	1.0	
1,1-Dichloroethane	ND	1.0	
1,2-Dichloroethane	ND	1.0	
1,1-Dichloroethene	ND	1.0	
cis-1,2-Dichloroethene	ND	1.0	
trans-1,2-Dichloroethene	ND	1.0	
1,2-Dichloropropane	ND	1.0	
cis-1,3-Dichloropropene	ND	1.0	
trans-1,3-Dichloropropene	ND	1.0	
Ethylbenzene	ND	1.0	
Methylene chloride	ND	1.0	
1,1,2,2-Tetrachloroethane	ND	1.0	
Tetrachloroethene	ND	1.0	
Toluene	ND	1.0	
1,1,1-Trichloroethane	ND	1.0	
1,1,2-Trichloroethane	ND	1.0	
Trichloroethene	ND	1.0	
Trichlorofluoromethane	ND	2.0	
Vinyl chloride	ND	2.0	
m-Xylene & p-Xylene	ND	1.0	
o-Xylene	ND	1.0	
Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	95	70-130	
1,2-Dichloroethane-d4	109	60-140	
Toluene-d8	98	70-130	

Client: PHIBRO-TECH, INC.

Metals

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW1S-045

Lab Sample ID: E9J270242-001

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9301234

Matrix: Water

Units: mg/L

Method: 6010B

Preparation: 3005A

Date Sampled: 10/27/99

Date Prepared: 10/28/99

Date Analyzed: 10/29/99

Analyte	Result	RL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	1	
Chromium	ND	0.010	1	
Copper	ND	0.025	1	

Client Sample ID: PTI-MW1D-045

Lab Sample ID: E9J270242-002

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9301234

Matrix: Water

Units: mg/L

Method: 6010B

Preparation: 3005A

Date Sampled: 10/27/99

Date Prepared: 10/28/99

Date Analyzed: 10/29/99

Analyte	Result	RL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	1	
Chromium	ND	0.010	1	
Copper	ND	0.025	1	

Client Sample ID: PTI-MW3-045

Lab Sample ID: E9J270242-003

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9301234

Matrix: Water

Units: mg/L

Method: 6010B

Preparation: 3005A

Date Sampled: 10/27/99

Date Prepared: 10/28/99

Date Analyzed: 10/29/99

Analyte	Result	RL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	1	
Chromium	ND	0.010	1	
Copper	ND	0.025	1	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW11-045

Lab Sample ID: E9J270242-004

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9301234

Matrix: Water

Units: mg/L

Method: 6010B

Preparation: 3005A

Date Sampled: 10/27/99

Date Prepared: 10/28/99

Date Analyzed: 10/29/99

Analyte	Result	RL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	1	
Chromium	0.020	0.010	1	
Copper	ND	0.025	1	

Client Sample ID: PTI-MW6B-045

Lab Sample ID: E9J270242-005

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9301234

Matrix: Water

Units: mg/L

Method: 6010B

Preparation: 3005A

Date Sampled: 10/27/99

Date Prepared: 10/28/99

Date Analyzed: 10/29/99

Analyte	Result	RL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	1	
Chromium	ND	0.010	1	
Copper	ND	0.025	1	

Client Sample ID: PTI-MW6D-045

Lab Sample ID: E9J270242-006

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9301234

Matrix: Water

Units: mg/L

Method: 6010B

Preparation: 3005A

Date Sampled: 10/27/99

Date Prepared: 10/28/99

Date Analyzed: 10/29/99

Analyte	Result	RL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	1	
Chromium	ND	0.010	1	
Copper	ND	0.025	1	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-EB01-045

Lab Sample ID: E9J270242-007

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9301234

Matrix: Water

Units: mg/L

Method: 6010B

Preparation: 3005A

Date Sampled: 10/27/99

Date Prepared: 10/28/99

Date Analyzed: 10/29/99

Analyte	Result	RL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	1	
Chromium	ND	0.010	1	
Copper	ND	0.025	1	

Client Sample ID: PTI-MW7-045

Lab Sample ID: E9J270242-008

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9301234

Matrix: Water

Units: mg/L

Method: 6010B

Preparation: 3005A

Date Sampled: 10/27/99

Date Prepared: 10/28/99

Date Analyzed: 10/29/99

Analyte	Result	RL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	1	
Chromium	ND	0.010	1	
Copper	0.071	0.025	1	

Client: PHIBRO-TECH, INC.

Classical Chemistry

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW1S-045

Lab Sample ID: E9J270242-001

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9302228

Matrix: Water

Units: No Units

Method: 9040B

Preparation: 9040B

Date Sampled: 10/27/99

Date Prepared: 10/27/99

Date Analyzed: 10/27/99

Analyte	Result	RL	Dil. Factor	Qualifier
pH	6.8	0.10	1	

Client Sample ID: PTI-MW1S-045

Lab Sample ID: E9J270242-001

Hexavalent Chromium
Hexavalent Chromium

Batch: 9302231

Matrix: Water

Units: mg/L

Method: 7196A

Preparation: 7196A

Date Sampled: 10/27/99

Date Prepared: 10/27/99

Date Analyzed: 10/27/99

Analyte	Result	RL	Dil. Factor	Qualifier
Hexavalent Chromium	ND	0.010	1	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW1D-045

Lab Sample ID: E9J270242-002

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9302228

Matrix: Water

Units: No Units

Method: 9040B

Preparation: 9040B

Date Sampled: 10/27/99

Date Prepared: 10/27/99

Date Analyzed: 10/27/99

Analyte	Result	RL	Dil. Factor	Qualifier
pH	7.2	0.10	1	

Client Sample ID: PTI-MW1D-045

Lab Sample ID: E9J270242-002

Hexavalent Chromium
Hexavalent Chromium

Batch: 9302231

Matrix: Water

Units: mg/L

Method: 7196A

Preparation: 7196A

Date Sampled: 10/27/99

Date Prepared: 10/27/99

Date Analyzed: 10/27/99

Analyte	Result	RL	Dil. Factor	Qualifier
Hexavalent Chromium	0.014	0.010	1	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW3-045

Lab Sample ID: E9J270242-003

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9302228

Matrix: Water

Units: No Units

Method: 9040B

Preparation: 9040B

Date Sampled: 10/27/99

Date Prepared: 10/27/99

Date Analyzed: 10/27/99

Analyte	Result	RL	Dil. Factor	Qualifier
pH	7.1	0.10	1	

Client Sample ID: PTI-MW3-045

Lab Sample ID: E9J270242-003

Hexavalent Chromium
Hexavalent Chromium

Batch: 9302231

Matrix: Water

Units: mg/L

Method: 7196A

Preparation: 7196A

Date Sampled: 10/27/99

Date Prepared: 10/27/99

Date Analyzed: 10/27/99

Analyte	Result	RL	Dil. Factor	Qualifier
Hexavalent Chromium	ND	0.010	1	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW11-045

Lab Sample ID: E9J270242-004

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9302228

Matrix: Water

Units: No Units

Method: 9040B

Preparation: 9040B

Date Sampled: 10/27/99

Date Prepared: 10/27/99

Date Analyzed: 10/27/99

Analyte	Result	RL	Dil. Factor	Qualifier
pH	7.0	0.10	1	

Client Sample ID: PTI-MW11-045

Lab Sample ID: E9J270242-004

Hexavalent Chromium
Hexavalent Chromium

Batch: 9302231

Matrix: Water

Units: mg/L

Method: 7196A

Preparation: 7196A

Date Sampled: 10/27/99

Date Prepared: 10/27/99

Date Analyzed: 10/27/99

Analyte	Result	RL	Dil. Factor	Qualifier
Hexavalent Chromium	0.057	0.010	1	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW6B-045

Lab Sample ID: E9J270242-005

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9302228

Matrix: Water

Units: No Units

Method: 9040B

Preparation: 9040B

Date Sampled: 10/27/99

Date Prepared: 10/27/99

Date Analyzed: 10/27/99

Analyte	Result	RL	Dil. Factor	Qualifier
pH	7.2	0.10	1	

Client Sample ID: PTI-MW6B-045

Lab Sample ID: E9J270242-005

Hexavalent Chromium
Hexavalent Chromium

Batch: 9302231

Matrix: Water

Units: mg/L

Method: 7196A

Preparation: 7196A

Date Sampled: 10/27/99

Date Prepared: 10/27/99

Date Analyzed: 10/27/99

Analyte	Result	RL	Dil. Factor	Qualifier
Hexavalent Chromium	ND	0.010	1	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW6D-045

Lab Sample ID: E9J270242-006

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9302228

Matrix: Water

Units: No Units

Method: 9040B

Preparation: 9040B

Date Sampled: 10/27/99

Date Prepared: 10/27/99

Date Analyzed: 10/27/99

Analyte	Result	RL	Dil. Factor	Qualifier
pH	7.3	0.10	1	

Client Sample ID: PTI-MW6D-045

Lab Sample ID: E9J270242-006

Hexavalent Chromium
Hexavalent Chromium

Batch: 9302231

Matrix: Water

Units: mg/L

Method: 7196A

Preparation: 7196A

Date Sampled: 10/27/99

Date Prepared: 10/27/99

Date Analyzed: 10/27/99

Analyte	Result	RL	Dil. Factor	Qualifier
Hexavalent Chromium	ND	0.010	1	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-EB01-045

Lab Sample ID: E9J270242-007

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9302228

Matrix: Water

Units: No Units

Method: 9040B

Preparation: 9040B

Date Sampled: 10/27/99

Date Prepared: 10/27/99

Date Analyzed: 10/27/99

Analyte	Result	RL	Dil. Factor	Qualifier
pH	6.1	0.10	1	

Client Sample ID: PTI-EB01-045

Lab Sample ID: E9J270242-007

Hexavalent Chromium
Hexavalent Chromium

Batch: 9302231

Matrix: Water

Units: mg/L

Method: 7196A

Preparation: 7196A

Date Sampled: 10/27/99

Date Prepared: 10/27/99

Date Analyzed: 10/27/99

Analyte	Result	RL	Dil. Factor	Qualifier
Hexavalent Chromium	ND	0.010	1	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW7-045

Lab Sample ID: E9J270242-008

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9302228

Matrix: Water

Units: No Units

Method: 9040B

Preparation: 9040B

Date Sampled: 10/27/99

Date Prepared: 10/27/99

Date Analyzed: 10/27/99

Analyte	Result	RL	Dil. Factor	Qualifier
pH	6.8	0.10	1	

Client Sample ID: PTI-MW7-045

Lab Sample ID: E9J270242-008

Hexavalent Chromium
Hexavalent Chromium

Batch: 9302231

Matrix: Water

Units: mg/L

Method: 7196A

Preparation: 7196A

Date Sampled: 10/27/99

Date Prepared: 10/27/99

Date Analyzed: 10/27/99

Analyte	Result	RL	Dil. Factor	Qualifier
Hexavalent Chromium	ND	0.010	1	

Quality Control Batch Assignment Report

<u>Lab Sample ID</u>	<u>Matrix</u>	<u>Method</u>	<u>Batch ID</u>	<u>MS Run Number</u>
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Metals

E9J270242-001	WATER	6010B	9301234	9301073
E9J270242-002	WATER	6010B	9301234	9301073
E9J270242-003	WATER	6010B	9301234	9301073
E9J270242-004	WATER	6010B	9301234	9301073
E9J270242-005	WATER	6010B	9301234	9301073
E9J270242-006	WATER	6010B	9301234	9301073
E9J270242-007	WATER	6010B	9301234	9301073
E9J270242-008	WATER	6010B	9301234	9301073

GC/MS Volatiles

E9J260173-001	WATER	8260B	9300402	9300207
E9J270242-001	WATER	8260B	9301418	9300207
E9J270242-002	WATER	8260B	9301418	9300207
E9J270242-003	WATER	8260B	9302413	9302185
E9J270242-004	WATER	8260B	9302413	9302185
E9J270242-005	WATER	8260B	9302413	9302185
E9J270242-006	WATER	8260B	9301418	9300207
E9J270242-007	WATER	8260B	9301418	9300207
E9J270242-008	WATER	8260B	9302413	9302185
E9J270242-009	WATER	8260B	9301418	9300207
E9J280186-007	WATER	8260B	9302413	9302185

Classical Chemistry

E9J270242-001	WATER	7196A	9302231
E9J270242-001		9040B	9302228
E9J270242-002	WATER	7196A	9302231
E9J270242-002		9040B	9302228
E9J270242-003	WATER	7196A	9302231
E9J270242-003		9040B	9302228
E9J270242-004	WATER	7196A	9302231
E9J270242-004		9040B	9302228
E9J270242-005	WATER	7196A	9302231
E9J270242-005		9040B	9302228
E9J270242-006	WATER	7196A	9302231
E9J270242-006		9040B	9302228
E9J270242-007	WATER	7196A	9302231
E9J270242-007		9040B	9302228
E9J270242-008	WATER	7196A	9302231
E9J270242-008		9040B	9302228

Table of Definitions

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Metals

Batch ID: 9301234

Inductively Coupled Plasma (6010B)

Method Blank

Lab Sample ID: E9J280000-234B

Matrix: Water

Units: mg/L

Analyte	Result	RL	Qual.	Date Analyzed
Cadmium	ND	0.0050		10/29/99
Chromium	ND	0.010		10/29/99
Copper	ND	0.025		10/29/99

Laboratory Control Sample

Lab Sample ID: E9J280000-234C

Matrix: Water

Units: mg/L

Analyte	Spike Amount	Result	% Rec.	QC Limits	Qualifier
Cadmium	0.0500	0.0510	102	80-120	
Chromium	0.200	0.212	106	80-120	
Copper	0.250	0.247	99	80-120	

Matrix Spike / Matrix Spike Duplicate

Lab Sample ID: E9J270242-001S

Matrix: Water

Units: mg/L

Analyte	Sample Result	Spike Amount	Result		% Rec.		Control Limits	RPD	Qualifier	
			MS	MSD	MS	MSD			MS	MSD
Cadmium	ND	0.0500	0.0504	0.0471	101	94	80-120	6.9		
Chromium	ND	0.200	0.209	0.196	104	98	80-120	6.1		
Copper	ND	0.250	0.280	0.274	109	107	80-120	2.2		

Classical Chemistry

Batch ID: 9302231

Hexavalent Chromium

Method Blank

Lab Sample ID: E9J290000-231B

Matrix: Water

Units: mg/L

Analyte	Result	RL	Qual.	Date Analyzed
Hexavalent Chromium	ND	0.010		10/27/99

Laboratory Control Sample

Lab Sample ID: E9J290000-231C

Matrix: Water

Units: mg/L

Analyte	Spike Amount	Result	% Rec.	QC Limits	Qualifier
Hexavalent Chromium	0.0500	0.0490	98	80-120	

Laboratory Control Sample

Lab Sample ID: E9J290000-228C

Matrix: Water

Units: No Units

Analyte	Spike Amount	Result	% Rec.	QC Limits	Qualifier
pH	9.18	9.18	100	90-110	

GC/MS Volatiles

Batch ID: 9301418

Volatile Organics, GC/MS (8260B)

Method Blank

Lab Sample ID: E9J280000-418B

Matrix: Water

Units: ug/L

Analyte	Result	RL	Qual.	Date Analyzed
Benzene	ND	1.0		10/27/99
Bromodichloromethane	ND	1.0		10/27/99
Bromoform	ND	1.0		10/27/99
Bromomethane	ND	2.0		10/27/99
Carbon tetrachloride	ND	1.0		10/27/99
Chlorobenzene	ND	1.0		10/27/99
Dibromochloromethane	ND	1.0		10/27/99
Chloroethane	ND	2.0		10/27/99
Chloroform	ND	1.0		10/27/99
Chloromethane	ND	2.0		10/27/99
1,2-Dichlorobenzene	ND	1.0		10/27/99
1,3-Dichlorobenzene	ND	1.0		10/27/99
1,4-Dichlorobenzene	ND	1.0		10/27/99
1,1-Dichloroethane	ND	1.0		10/27/99
1,2-Dichloroethane	ND	1.0		10/27/99
1,1-Dichloroethene	ND	1.0		10/27/99
cis-1,2-Dichloroethene	ND	1.0		10/27/99
trans-1,2-Dichloroethene	ND	1.0		10/27/99
1,2-Dichloropropane	ND	1.0		10/27/99
cis-1,3-Dichloropropene	ND	1.0		10/27/99
trans-1,3-Dichloropropene	ND	1.0		10/27/99
Ethylbenzene	ND	1.0		10/27/99
Methylene chloride	ND	1.0		10/27/99
1,1,2,2-Tetrachloroethane	ND	1.0		10/27/99
Tetrachloroethene	ND	1.0		10/27/99
Toluene	ND	1.0		10/27/99
1,1,1-Trichloroethane	ND	1.0		10/27/99
1,1,2-Trichloroethane	ND	1.0		10/27/99
Trichloroethene	ND	1.0		10/27/99
Trichlorofluoromethane	ND	2.0		10/27/99
Vinyl chloride	ND	2.0		10/27/99
m-Xylene & p-Xylene	ND	1.0		10/27/99
o-Xylene	ND	1.0		10/27/99

Batch ID: 9301418

Volatile Organics, GC/MS (8260B)

Method Blank, continued

Lab Sample ID: E9J280000-418B

Matrix: Water

Units: ug/L

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	94	70-130	
1,2-Dichloroethane-d4	108	60-140	
Toluene-d8	94	70-130	

Laboratory Control Sample

Lab Sample ID: E9J280000-418C

Matrix: Water

Units: ug/L

Analyte	Spike Amount	Result	% Rec.	QC Limits	Qualifier
Benzene	10.0	9.80	98	70-130	
Chlorobenzene	10.0	10.1	101	70-130	
1,1-Dichloroethene	10.0	10.6	106	60-140	
Toluene	10.0	9.61	96	70-130	
Trichloroethene	10.0	11.2	112	70-130	

Surrogate

Bromofluorobenzene	10.0	10.3	103	70-130	
1,2-Dichloroethane-d4	10.0	11.7	117	60-140	
Toluene-d8	10.0	10.2	102	70-130	

Batch ID: 9302413

Volatile Organics, GC/MS (8260B)

Method Blank

Lab Sample ID: E9J290000-413B

Matrix: Water

Units: ug/L

Analyte	Result	RL	Qual.	Date Analyzed
Benzene	ND	1.0		10/28/99
Bromodichloromethane	ND	1.0		10/28/99
Bromoform	ND	1.0		10/28/99
Bromomethane	ND	2.0		10/28/99
Carbon tetrachloride	ND	1.0		10/28/99
Chlorobenzene	ND	1.0		10/28/99
Dibromochloromethane	ND	1.0		10/28/99
Chloroethane	ND	2.0		10/28/99
Chloroform	ND	1.0		10/28/99
Chloromethane	ND	2.0		10/28/99
1,2-Dichlorobenzene	ND	1.0		10/28/99
1,3-Dichlorobenzene	ND	1.0		10/28/99
1,4-Dichlorobenzene	ND	1.0		10/28/99
1,1-Dichloroethane	ND	1.0		10/28/99
1,2-Dichloroethane	ND	1.0		10/28/99
1,1-Dichloroethene	ND	1.0		10/28/99
cis-1,2-Dichloroethene	ND	1.0		10/28/99
trans-1,2-Dichloroethene	ND	1.0		10/28/99
1,2-Dichloropropane	ND	1.0		10/28/99
cis-1,3-Dichloropropene	ND	1.0		10/28/99
trans-1,3-Dichloropropene	ND	1.0		10/28/99
Ethylbenzene	ND	1.0		10/28/99
Methylene chloride	ND	1.0		10/28/99
1,1,2,2-Tetrachloroethane	ND	1.0		10/28/99
Tetrachloroethene	ND	1.0		10/28/99
Toluene	ND	1.0		10/28/99
1,1,1-Trichloroethane	ND	1.0		10/28/99
1,1,2-Trichloroethane	ND	1.0		10/28/99
Trichloroethene	ND	1.0		10/28/99
Trichlorofluoromethane	ND	2.0		10/28/99
Vinyl chloride	ND	2.0		10/28/99
m-Xylene & p-Xylene	ND	1.0		10/28/99
o-Xylene	ND	1.0		10/28/99

Batch ID: 9302413

Volatile Organics, GC/MS (8260B)

Method Blank, continued

Lab Sample ID: E9J290000-413B

Matrix: Water

Units: ug/L

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	96	70-130	
1,2-Dichloroethane-d4	110	60-140	
Toluene-d8	107	70-130	

Laboratory Control Sample

Lab Sample ID: E9J290000-413C

Matrix: Water

Units: ug/L

Analyte	Spike Amount	Result	% Rec.	QC Limits	Qualifier
Benzene	10.0	10.4	104	70-130	
Chlorobenzene	10.0	10.1	101	70-130	
1,1-Dichloroethene	10.0	10.4	104	60-140	
Toluene	10.0	10.2	102	70-130	
Trichloroethene	10.0	11.5	115	70-130	

Surrogate

Bromofluorobenzene	10.0	10.2	102	70-130	
1,2-Dichloroethane-d4	10.0	10.6	106	60-140	
Toluene-d8	10.0	10.8	108	70-130	

**Volatile Organics, GC/MS (8260B)**

Lab Sample ID E9J280186-007S

Matrix: Water

Units: ug/L

Surrogate

Bromofluorobenzene	10	10.0	10.1	10.3	101	103	70-130
1,2-Dichloroethane-d4	11	10.0	11.3	11.0	113	110	60-140
Toluene-d8	10	10.0	10.4	10.5	104	105	70-130

[illegible]

Precis
A Quanterra Product...

Quanterra
1721 South Grand Ave.
Santa Ana, CA 92705

Tel (714) 258-8610
Fax (714) 258-0921

November 5, 1999

QUANTERRA INCORPORATED LOT NUMBER: E9J280266
PO/CONTRACT: 2279-11462-111.FLD

Sharon Wallin
Camp, Dresser, McKee
18881 Von Karman, Suite 650
Irvine, CA 92612

Dear Ms. Wallin,

This report contains the analytical results for the 11 samples received under chain of custody by Quanterra Incorporated on October 28, 1999. These samples are associated with your PTI - Santa Fe Springs project.

All applicable quality control procedures met method-specified acceptance criteria.

This report shall not be reproduced except in full, without the written approval of the laboratory.

If you have any questions, please feel free to call me at 714-258-8610.

Sincerely,



Diane Suzuki
Project Manager

cc: Ed Vigil, Phibro Tech, Santa Fe Springs, CA
project file

Laboratory/Client Sample Cross-Reference

Lab Sample ID	Client Sample ID	Date	Matrix
E9J280266-001	PTI-MW04A-045	10/28/99	Water
E9J280266-002	PTI-MW04-045	10/28/99	Water
E9J280266-003	PTI-MW14S-045	10/28/99	Water
E9J280266-004	PTI-MW15D-045	10/28/99	Water
E9J280266-005	PTI-EB02-045	10/28/99	Water
E9J280266-006	PTI-MW15S-045	10/28/99	Water
E9J280266-007	PTI-MW16-045	10/28/99	Water
E9J280266-008	PTI-MW9-045	10/28/99	Water
E9J280266-009	PTI-MW35-045	10/28/99	Water
E9J280266-010	PTI-MW37-045	10/28/99	Water
E9J280266-011	PTI-TB02-045	10/28/99	Water

Client: PHIBRO-TECH, INC.

GC/MS Volatiles

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW04A-045

Lab Sample ID: E9J280266-001

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9302413

Matrix: Water

Units: ug/L

Dil. Factor: 1

Method: 8260B

Preparation: 5030B/8260B

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Qualifier
Benzene	ND	1.0	
Bromodichloromethane	ND	1.0	
Bromoform	ND	1.0	
Bromomethane	ND	2.0	
Carbon tetrachloride	ND	1.0	
Chlorobenzene	ND	1.0	
Dibromochloromethane	ND	1.0	
Chloroethane	ND	2.0	
Chloroform	ND	1.0	
Chloromethane	ND	2.0	
1,2-Dichlorobenzene	ND	1.0	
1,3-Dichlorobenzene	ND	1.0	
1,4-Dichlorobenzene	ND	1.0	
1,1-Dichloroethane	1.4	1.0	
1,2-Dichloroethane	ND	1.0	
1,1-Dichloroethene	ND	1.0	
cis-1,2-Dichloroethene	ND	1.0	
trans-1,2-Dichloroethene	ND	1.0	
1,2-Dichloropropane	ND	1.0	
cis-1,3-Dichloropropene	ND	1.0	
trans-1,3-Dichloropropene	ND	1.0	
Ethylbenzene	ND	1.0	
Methylene chloride	ND	1.0	
1,1,2,2-Tetrachloroethane	ND	1.0	
Tetrachloroethene	2.0	1.0	
Toluene	ND	1.0	
1,1,1-Trichloroethane	ND	1.0	
1,1,2-Trichloroethane	ND	1.0	
Trichloroethene	4.5	1.0	
Trichlorofluoromethane	ND	2.0	
Vinyl chloride	ND	2.0	
m-Xylene & p-Xylene	ND	1.0	
o-Xylene	ND	1.0	
Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	102	70-130	
1,2-Dichloroethane-d4	114	60-140	
Toluene-d8	106	70-130	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW04-045

Lab Sample ID: E9J280266-002

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9302413

Matrix: Water

Units: ug/L

Dil. Factor: 5

Method: 8260B

Preparation: 5030B/8260B

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Qualifier
Benzene	ND	5.0	
Bromodichloromethane	ND	5.0	
Bromoform	ND	5.0	
Bromomethane	ND	10	
Carbon tetrachloride	ND	5.0	
Chlorobenzene	ND	5.0	
Dibromochloromethane	ND	5.0	
Chloroethane	ND	10	
Chloroform	25	5.0	
Chloromethane	ND	10	
1,2-Dichlorobenzene	ND	5.0	
1,3-Dichlorobenzene	ND	5.0	
1,4-Dichlorobenzene	ND	5.0	
1,1-Dichloroethane	170	5.0	
1,2-Dichloroethane	85	5.0	
1,1-Dichloroethene	82	5.0	
cis-1,2-Dichloroethene	160	5.0	
trans-1,2-Dichloroethene	ND	5.0	
1,2-Dichloropropane	ND	5.0	
cis-1,3-Dichloropropene	ND	5.0	
trans-1,3-Dichloropropene	ND	5.0	
Ethylbenzene	92	5.0	
Methylene chloride	130	5.0	
1,1,1,2-Tetrachloroethane	ND	5.0	
Tetrachloroethene	ND	5.0	
Toluene	ND	5.0	
1,1,1-Trichloroethane	ND	5.0	
1,1,2-Trichloroethane	ND	5.0	
Trichloroethene	210	5.0	
Trichlorofluoromethane	ND	10	
Vinyl chloride	ND	10	
m-Xylene & p-Xylene	11	5.0	
o-Xylene	ND	5.0	
Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	104	70-130	
1,2-Dichloroethane-d4	120	60-140	
Toluene-d8	108	70-130	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW14S-045

Lab Sample ID: E9J280266-003

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9302413

Matrix: Water

Units: ug/L

Dil. Factor: 5

Method: 8260B

Preparation: 5030B/8260B

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/29/99

Analyte	Result	RL	Qualifier
Benzene	ND	5.0	
Bromodichloromethane	ND	5.0	
Bromoform	ND	5.0	
Bromomethane	ND	10	
Carbon tetrachloride	37	5.0	
Chlorobenzene	ND	5.0	
Dibromochloromethane	ND	5.0	
Chloroethane	ND	10	
Chloroform	32	5.0	
Chloromethane	ND	10	
1,2-Dichlorobenzene	ND	5.0	
1,3-Dichlorobenzene	ND	5.0	
1,4-Dichlorobenzene	ND	5.0	
1,1-Dichloroethane	67	5.0	
1,2-Dichloroethane	22	5.0	
1,1-Dichloroethene	56	5.0	
cis-1,2-Dichloroethene	12	5.0	
trans-1,2-Dichloroethene	ND	5.0	
1,2-Dichloropropane	ND	5.0	
cis-1,3-Dichloropropene	ND	5.0	
trans-1,3-Dichloropropene	ND	5.0	
Ethylbenzene	120	5.0	
Methylene chloride	ND	5.0	
1,1,2,2-Tetrachloroethane	ND	5.0	
Tetrachloroethene	ND	5.0	
Toluene	ND	5.0	
1,1,1-Trichloroethane	ND	5.0	
1,1,2-Trichloroethane	ND	5.0	
Trichloroethene	180	5.0	
Trichlorofluoromethane	ND	10	
Vinyl chloride	ND	10	
m-Xylene & p-Xylene	ND	5.0	
o-Xylene	ND	5.0	
Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	101	70-130	
1,2-Dichloroethane-d4	113	60-140	
Toluene-d8	105	70-130	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW15D-045

Lab Sample ID: E9J280266-004

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9302413

Matrix: Water

Units: ug/L

Dil. Factor: 1

Method: 8260B

Preparation: 5030B/8260B

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/29/99

Analyte	Result	RL	Qualifier
Benzene	ND	1.0	
Bromodichloromethane	ND	1.0	
Bromoform	ND	1.0	
Bromomethane	ND	2.0	
Carbon tetrachloride	ND	1.0	
Chlorobenzene	ND	1.0	
Dibromochloromethane	ND	1.0	
Chloroethane	ND	2.0	
Chloroform	ND	1.0	
Chloromethane	ND	2.0	
1,2-Dichlorobenzene	ND	1.0	
1,3-Dichlorobenzene	ND	1.0	
1,4-Dichlorobenzene	ND	1.0	
1,1-Dichloroethane	ND	1.0	
1,2-Dichloroethane	ND	1.0	
1,1-Dichloroethene	ND	1.0	
cis-1,2-Dichloroethene	ND	1.0	
trans-1,2-Dichloroethene	ND	1.0	
1,2-Dichloropropane	ND	1.0	
cis-1,3-Dichloropropene	ND	1.0	
trans-1,3-Dichloropropene	ND	1.0	
Ethylbenzene	6.0	1.0	
Methylene chloride	ND	1.0	
1,1,2,2-Tetrachloroethane	ND	1.0	
Tetrachloroethene	1.5	1.0	
Toluene	ND	1.0	
1,1,1-Trichloroethane	ND	1.0	
1,1,2-Trichloroethane	ND	1.0	
Trichloroethene	5.1	1.0	
Trichlorofluoromethane	ND	2.0	
Vinyl chloride	ND	2.0	
m-Xylene & p-Xylene	ND	1.0	
o-Xylene	ND	1.0	
Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	96	70-130	
1,2-Dichloroethane-d4	111	60-140	
Toluene-d8	100	70-130	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-EB02-045

Lab Sample ID: E9J280266-005

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9302413

Matrix: Water

Units: ug/L

Dil. Factor: 1

Method: 8260B

Preparation: 5030B/8260B

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Qualifier
Benzene	ND	1.0	
Bromodichloromethane	ND	1.0	
Bromoform	ND	1.0	
Bromomethane	ND	2.0	
Carbon tetrachloride	ND	1.0	
Chlorobenzene	ND	1.0	
Dibromochloromethane	ND	1.0	
Chloroethane	ND	2.0	
Chloroform	ND	1.0	
Chloromethane	ND	2.0	
1,2-Dichlorobenzene	ND	1.0	
1,3-Dichlorobenzene	ND	1.0	
1,4-Dichlorobenzene	ND	1.0	
1,1-Dichloroethane	ND	1.0	
1,2-Dichloroethane	ND	1.0	
1,1-Dichloroethene	ND	1.0	
cis-1,2-Dichloroethene	ND	1.0	
trans-1,2-Dichloroethene	ND	1.0	
1,2-Dichloropropane	ND	1.0	
cis-1,3-Dichloropropene	ND	1.0	
trans-1,3-Dichloropropene	ND	1.0	
Ethylbenzene	ND	1.0	
Methylene chloride	ND	1.0	
1,1,2,2-Tetrachloroethane	ND	1.0	
Tetrachloroethene	ND	1.0	
Toluene	ND	1.0	
1,1,1-Trichloroethane	ND	1.0	
1,1,2-Trichloroethane	ND	1.0	
Trichloroethene	ND	1.0	
Trichlorofluoromethane	ND	2.0	
Vinyl chloride	ND	2.0	
m-Xylene & p-Xylene	ND	1.0	
o-Xylene	ND	1.0	
Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	104	70-130	
1,2-Dichloroethane-d4	119	60-140	
Toluene-d8	108	70-130	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW15S-045

Lab Sample ID: E9J280266-006

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9305444

Matrix: Water

Units: ug/L

Dil. Factor: 2

Method: 8260B

Preparation: 5030B/8260B

Date Sampled: 10/28/99

Date Prepared: 10/29/99

Date Analyzed: 10/30/99

Analyte	Result	RL	Qualifier
Benzene	ND	2.0	
Bromodichloromethane	ND	2.0	
Bromoform	ND	2.0	
Bromomethane	ND	4.0	
Carbon tetrachloride	ND	2.0	
Chlorobenzene	ND	2.0	
Dibromochloromethane	ND	2.0	
Chloroethane	ND	4.0	
Chloroform	2.1	2.0	
Chloromethane	ND	4.0	
1,2-Dichlorobenzene	ND	2.0	
1,3-Dichlorobenzene	ND	2.0	
1,4-Dichlorobenzene	ND	2.0	
1,1-Dichloroethane	ND	2.0	
1,2-Dichloroethane	110	2.0	
1,1-Dichloroethene	ND	2.0	
cis-1,2-Dichloroethene	ND	2.0	
trans-1,2-Dichloroethene	ND	2.0	
1,2-Dichloropropane	ND	2.0	
cis-1,3-Dichloropropene	ND	2.0	
trans-1,3-Dichloropropene	ND	2.0	
Ethylbenzene	12	2.0	
Methylene chloride	ND	2.0	
1,1,2,2-Tetrachloroethane	ND	2.0	
Tetrachloroethene	ND	2.0	
Toluene	ND	2.0	
1,1,1-Trichloroethane	ND	2.0	
1,1,2-Trichloroethane	ND	2.0	
Trichloroethene	6.7	2.0	
Trichlorofluoromethane	ND	4.0	
Vinyl chloride	ND	4.0	
m-Xylene & p-Xylene	ND	2.0	
o-Xylene	ND	2.0	
Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	102	70-130	
1,2-Dichloroethane-d4	132	60-140	
Toluene-d8	112	70-130	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW16-045

Lab Sample ID: E9J280266-007

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9305444

Matrix: Water

Units: ug/L

Dil. Factor: 5

Method: 8260B

Preparation: 5030B/8260B

Date Sampled: 10/28/99

Date Prepared: 10/29/99

Date Analyzed: 10/30/99

Analyte	Result	RL	Qualifier
Benzene	ND	5.0	
Bromodichloromethane	ND	5.0	
Bromoform	ND	5.0	
Bromomethane	ND	10	
Carbon tetrachloride	ND	5.0	
Chlorobenzene	ND	5.0	
Dibromochloromethane	ND	5.0	
Chloroethane	ND	10	
Chloroform	ND	5.0	
Chloromethane	ND	10	
1,2-Dichlorobenzene	ND	5.0	
1,3-Dichlorobenzene	ND	5.0	
1,4-Dichlorobenzene	ND	5.0	
1,1-Dichloroethane	220	5.0	
1,2-Dichloroethane	26	5.0	
1,1-Dichloroethene	30	5.0	
cis-1,2-Dichloroethene	41	5.0	
trans-1,2-Dichloroethene	8.4	5.0	
1,2-Dichloropropane	ND	5.0	
cis-1,3-Dichloropropene	ND	5.0	
trans-1,3-Dichloropropene	ND	5.0	
Ethylbenzene	ND	5.0	
Methylene chloride	ND	5.0	
1,1,2,2-Tetrachloroethane	ND	5.0	
Tetrachloroethene	ND	5.0	
Toluene	ND	5.0	
1,1,1-Trichloroethane	ND	5.0	
1,1,2-Trichloroethane	ND	5.0	
Trichloroethene	42	5.0	
Trichlorofluoromethane	ND	10	
Vinyl chloride	ND	10	
m-Xylene & p-Xylene	ND	5.0	
o-Xylene	ND	5.0	
Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	96	70-130	
1,2-Dichloroethane-d4	113	60-140	
Toluene-d8	105	70-130	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW9-045

Lab Sample ID: E9J280266-008

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9302413

Matrix: Water

Units: ug/L

Dil. Factor: 5

Method: 8260B

Preparation: 5030B/8260B

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/29/99

Analyte	Result	RL	Qualifier
Benzene	ND	5.0	
Bromodichloromethane	ND	5.0	
Bromoform	ND	5.0	
Bromomethane	ND	10	
Carbon tetrachloride	ND	5.0	
Chlorobenzene	ND	5.0	
Dibromochloromethane	ND	5.0	
Chloroethane	ND	10	
Chloroform	92	5.0	
Chloromethane	ND	10	
1,2-Dichlorobenzene	ND	5.0	
1,3-Dichlorobenzene	ND	5.0	
1,4-Dichlorobenzene	ND	5.0	
1,1-Dichloroethane	160	5.0	
1,2-Dichloroethane	85	5.0	
1,1-Dichloroethene	86	5.0	
cis-1,2-Dichloroethene	7.4	5.0	
trans-1,2-Dichloroethene	ND	5.0	
1,2-Dichloropropane	ND	5.0	
cis-1,3-Dichloropropene	ND	5.0	
trans-1,3-Dichloropropene	ND	5.0	
Ethylbenzene	ND	5.0	
Methylene chloride	250	5.0	
1,1,2,2-Tetrachloroethane	ND	5.0	
Tetrachloroethene	ND	5.0	
Toluene	ND	5.0	
1,1,1-Trichloroethane	ND	5.0	
1,1,2-Trichloroethane	ND	5.0	
Trichloroethene	280	5.0	
Trichlorofluoromethane	ND	10	
Vinyl chloride	ND	10	
m-Xylene & p-Xylene	ND	5.0	
o-Xylene	ND	5.0	
Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	93	70-130	
1,2-Dichloroethane-d4	116	60-140	
Toluene-d8	103	70-130	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW35-045

Lab Sample ID: E9J280266-009

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9302413

Matrix: Water

Units: ug/L

Dil. Factor: 5

Method: 8260B

Preparation: 5030B/8260B

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/29/99

Analyte	Result	RL	Qualifier
Benzene	ND	5.0	
Bromodichloromethane	ND	5.0	
Bromoform	ND	5.0	
Bromomethane	ND	10	
Carbon tetrachloride	ND	5.0	
Chlorobenzene	ND	5.0	
Dibromochloromethane	ND	5.0	
Chloroethane	ND	10	
Chloroform	30	5.0	
Chloromethane	ND	10	
1,2-Dichlorobenzene	ND	5.0	
1,3-Dichlorobenzene	ND	5.0	
1,4-Dichlorobenzene	ND	5.0	
1,1-Dichloroethane	190	5.0	
1,2-Dichloroethane	74	5.0	
1,1-Dichloroethene	88	5.0	
cis-1,2-Dichloroethene	170	5.0	
trans-1,2-Dichloroethene	5.4	5.0	
1,2-Dichloropropane	ND	5.0	
cis-1,3-Dichloropropene	ND	5.0	
trans-1,3-Dichloropropene	ND	5.0	
Ethylbenzene	80	5.0	
Methylene chloride	150	5.0	
1,1,2,2-Tetrachloroethane	ND	5.0	
Tetrachloroethene	ND	5.0	
Toluene	ND	5.0	
1,1,1-Trichloroethane	ND	5.0	
1,1,2-Trichloroethane	ND	5.0	
Trichloroethene	220	5.0	
Trichlorofluoromethane	ND	10	
Vinyl chloride	ND	10	
m-Xylene & p-Xylene	13	5.0	
o-Xylene	ND	5.0	
Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	99	70-130	
1,2-Dichloroethane-d4	113	60-140	
Toluene-d8	105	70-130	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW37-045

Lab Sample ID: E9J280266-010

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9302413

Matrix: Water

Units: ug/L

Dil. Factor: 5

Method: 8260B

Preparation: 5030B/8260B

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/29/99

Analyte	Result	RL	Qualifier
Benzene	ND	5.0	
Bromodichloromethane	ND	5.0	
Bromoform	ND	5.0	
Bromomethane	ND	10	
Carbon tetrachloride	ND	5.0	
Chlorobenzene	ND	5.0	
Dibromochloromethane	ND	5.0	
Chloroethane	ND	10	
Chloroform	94	5.0	
Chloromethane	ND	10	
1,2-Dichlorobenzene	ND	5.0	
1,3-Dichlorobenzene	ND	5.0	
1,4-Dichlorobenzene	ND	5.0	
1,1-Dichloroethane	180	5.0	
1,2-Dichloroethane	88	5.0	
1,1-Dichloroethene	92	5.0	
cis-1,2-Dichloroethene	8.0	5.0	
trans-1,2-Dichloroethene	ND	5.0	
1,2-Dichloropropane	ND	5.0	
cis-1,3-Dichloropropene	ND	5.0	
trans-1,3-Dichloropropene	ND	5.0	
Ethylbenzene	ND	5.0	
Methylene chloride	250	5.0	
1,1,2,2-Tetrachloroethane	ND	5.0	
Tetrachloroethene	ND	5.0	
Toluene	ND	5.0	
1,1,1-Trichloroethane	ND	5.0	
1,1,2-Trichloroethane	ND	5.0	
Trichloroethene	290	5.0	
Trichlorofluoromethane	ND	10	
Vinyl chloride	ND	10	
m-Xylene & p-Xylene	ND	5.0	
o-Xylene	ND	5.0	
Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	98	70-130	
1,2-Dichloroethane-d4	121	60-140	
Toluene-d8	105	70-130	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-TB02-045

Lab Sample ID: E9J280266-011

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9302413

Matrix: Water

Units: ug/L

Dil. Factor: 1

Method: 8260B

Preparation: 5030B/8260B

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Qualifier
Benzene	ND	1.0	
Bromodichloromethane	ND	1.0	
Bromoform	ND	1.0	
Bromomethane	ND	2.0	
Carbon tetrachloride	ND	1.0	
Chlorobenzene	ND	1.0	
Dibromochloromethane	ND	1.0	
Chloroethane	ND	2.0	
Chloroform	ND	1.0	
Chloromethane	ND	2.0	
1,2-Dichlorobenzene	ND	1.0	
1,3-Dichlorobenzene	ND	1.0	
1,4-Dichlorobenzene	ND	1.0	
1,1-Dichloroethane	ND	1.0	
1,2-Dichloroethane	ND	1.0	
1,1-Dichloroethene	ND	1.0	
cis-1,2-Dichloroethene	ND	1.0	
trans-1,2-Dichloroethene	ND	1.0	
1,2-Dichloropropane	ND	1.0	
cis-1,3-Dichloropropene	ND	1.0	
trans-1,3-Dichloropropene	ND	1.0	
Ethylbenzene	ND	1.0	
Methylene chloride	ND	1.0	
1,1,2,2-Tetrachloroethane	ND	1.0	
Tetrachloroethene	ND	1.0	
Toluene	ND	1.0	
1,1,1-Trichloroethane	ND	1.0	
1,1,2-Trichloroethane	ND	1.0	
Trichloroethene	ND	1.0	
Trichlorofluoromethane	ND	2.0	
Vinyl chloride	ND	2.0	
m-Xylene & p-Xylene	ND	1.0	
o-Xylene	ND	1.0	
Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	103	70-130	
1,2-Dichloroethane-d4	112	60-140	
Toluene-d8	103	70-130	

Client: PHIBRO-TECH, INC.

Metals

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW04A-045

Lab Sample ID: E9J280266-001

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9302196

Matrix: Water

Units: mg/L

Method: 6010B

Preparation: 3005A

Date Sampled: 10/28/99

Date Prepared: 10/29/99

Date Analyzed: 11/01/99

Analyte	Result	RL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	1	
Chromium	ND	0.010	1	
Copper	ND	0.025	1	

Client Sample ID: PTI-MW04-045

Lab Sample ID: E9J280266-002

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9302196

Matrix: Water

Units: mg/L

Method: 6010B

Preparation: 3005A

Date Sampled: 10/28/99

Date Prepared: 10/29/99

Date Analyzed: 11/01/99

Analyte	Result	RL	Dil. Factor	Qualifier
Cadmium	0.59	0.015	3	
Chromium	105	0.030	3	
Copper	ND	0.075	3	

Client Sample ID: PTI-MW14S-045

Lab Sample ID: E9J280266-003

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9302196

Matrix: Water

Units: mg/L

Method: 6010B

Preparation: 3005A

Date Sampled: 10/28/99

Date Prepared: 10/29/99

Date Analyzed: 11/01/99

Analyte	Result	RL	Dil. Factor	Qualifier
Cadmium	0.0060	0.0050	1	
Chromium	0.15	0.010	1	
Copper	0.044	0.025	1	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW15D-045

Lab Sample ID: E9J280266-004

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9302196

Matrix: Water

Units: mg/L

Method: 6010B

Preparation: 3005A

Date Sampled: 10/28/99

Date Prepared: 10/29/99

Date Analyzed: 11/01/99

Analyte	Result	RL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	1	
Chromium	ND	0.010	1	
Copper	ND	0.025	1	

Client Sample ID: PTI-EB02-045

Lab Sample ID: E9J280266-005

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9302196

Matrix: Water

Units: mg/L

Method: 6010B

Preparation: 3005A

Date Sampled: 10/28/99

Date Prepared: 10/29/99

Date Analyzed: 11/01/99

Analyte	Result	RL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	1	
Chromium	ND	0.010	1	
Copper	ND	0.025	1	

Client Sample ID: PTI-MW15S-045

Lab Sample ID: E9J280266-006

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9302196

Matrix: Water

Units: mg/L

Method: 6010B

Preparation: 3005A

Date Sampled: 10/28/99

Date Prepared: 10/29/99

Date Analyzed: 11/01/99

Analyte	Result	RL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	1	
Chromium	0.015	0.010	1	
Copper	ND	0.025	1	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW16-045

Lab Sample ID: E9J280266-007

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9302196

Matrix: Water

Units: mg/L

Method: 6010B

Preparation: 3005A

Date Sampled: 10/28/99

Date Prepared: 10/29/99

Date Analyzed: 11/01/99

Analyte	Result	RL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	1	
Chromium	ND	0.010	1	
Copper	ND	0.025	1	

Client Sample ID: PTI-MW9-045

Lab Sample ID: E9J280266-008

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9302196

Matrix: Water

Units: mg/L

Method: 6010B

Preparation: 3005A

Date Sampled: 10/28/99

Date Prepared: 10/29/99

Date Analyzed: 11/01/99

Analyte	Result	RL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	1	
Chromium	4.2	0.010	1	
Copper	ND	0.025	1	

Client Sample ID: PTI-MW35-045

Lab Sample ID: E9J280266-009

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9302196

Matrix: Water

Units: mg/L

Method: 6010B

Preparation: 3005A

Date Sampled: 10/28/99

Date Prepared: 10/29/99

Date Analyzed: 11/01/99

Analyte	Result	RL	Dil. Factor	Qualifier
Cadmium	0.58	0.0050	1	
Chromium	102	0.010	1	
Copper	ND	0.025	1	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW37-045

Lab Sample ID: E9J280266-010

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9302196

Matrix: Water

Units: mg/L

Method: 6010B

Preparation: 3005A

Date Sampled: 10/28/99

Date Prepared: 10/29/99

Date Analyzed: 11/01/99

Analyte	Result	RL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	1	
Chromium	4.2	0.010	1	
Copper	ND	0.025	1	

Client: PHIBRO-TECH, INC.

Classical Chemistry

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW04A-045

Lab Sample ID: E9J280266-001

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9302229

Matrix: Water

Units: No Units

Method: 9040B

Preparation: 9040B

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Dil. Factor	Qualifier
pH	7.1	0.10	1	

Client Sample ID: PTI-MW04A-045

Lab Sample ID: E9J280266-001

Hexavalent Chromium
Hexavalent Chromium

Batch: 9302232

Matrix: Water

Units: mg/L

Method: 7196A

Preparation: 7196A

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Dil. Factor	Qualifier
Hexavalent Chromium	0.017	0.010	1	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW04-045

Lab Sample ID: E9J280266-002

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9302229

Matrix: Water

Units: No Units

Method: 9040B

Preparation: 9040B

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Dil. Factor	Qualifier
pH	6.5	0.10	1	

Client Sample ID: PTI-MW04-045

Lab Sample ID: E9J280266-002

Hexavalent Chromium
Hexavalent Chromium

Batch: 9302232

Matrix: Water

Units: mg/L

Method: 7196A

Preparation: 7196A

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Dil. Factor	Qualifier
Hexavalent Chromium	58.2	10.0	1000	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW14S-045

Lab Sample ID: E9J280266-003

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9302229

Matrix: Water

Units: No Units

Method: 9040B

Preparation: 9040B

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Dil. Factor	Qualifier
pH	6.8	0.10	1	

Client Sample ID: PTI-MW14S-045

Lab Sample ID: E9J280266-003

Hexavalent Chromium
Hexavalent Chromium

Batch: 9302232

Matrix: Water

Units: mg/L

Method: 7196A

Preparation: 7196A

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Dil. Factor	Qualifier
Hexavalent Chromium	0.035	0.010	1	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW15D-045

Lab Sample ID: E9J280266-004

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9302229

Matrix: Water

Units: No Units

Method: 9040B

Preparation: 9040B

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Dil. Factor	Qualifier
pH	7.4	0.10	1	

Client Sample ID: PTI-MW15D-045

Lab Sample ID: E9J280266-004

Hexavalent Chromium
Hexavalent Chromium

Batch: 9302232

Matrix: Water

Units: mg/L

Method: 7196A

Preparation: 7196A

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Dil. Factor	Qualifier
Hexavalent Chromium	ND	0.010	1	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-EB02-045

Lab Sample ID: E9J280266-005

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9302229

Matrix: Water

Units: No Units

Method: 9040B

Preparation: 9040B

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Dil. Factor	Qualifier
pH	6.6	0.10	1	

Client Sample ID: PTI-EB02-045

Lab Sample ID: E9J280266-005

Hexavalent Chromium
Hexavalent Chromium

Batch: 9302232

Matrix: Water

Units: mg/L

Method: 7196A

Preparation: 7196A

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Dil. Factor	Qualifier
Hexavalent Chromium	ND	0.010	1	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW15S-045

Lab Sample ID: E9J280266-006

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9302229

Matrix: Water

Units: No Units

Method: 9040B

Preparation: 9040B

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Dil. Factor	Qualifier
pH	7.2	0.10	1	

Client Sample ID: PTI-MW15S-045

Lab Sample ID: E9J280266-006

Hexavalent Chromium
Hexavalent Chromium

Batch: 9302232

Matrix: Water

Units: mg/L

Method: 7196A

Preparation: 7196A

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Dil. Factor	Qualifier
Hexavalent Chromium	0.014	0.010	1	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW16-045

Lab Sample ID: E9J280266-007

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9302229

Matrix: Water

Units: No Units

Method: 9040B

Preparation: 9040B

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Dil. Factor	Qualifier
pH	6.7	0.10	1	

Client Sample ID: PTI-MW16-045

Lab Sample ID: E9J280266-007

Hexavalent Chromium
Hexavalent Chromium

Batch: 9302232

Matrix: Water

Units: mg/L

Method: 7196A

Preparation: 7196A

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Dil. Factor	Qualifier
Hexavalent Chromium	ND	0.010	1	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW9-045

Lab Sample ID: E9J280266-008

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9302229

Matrix: Water

Units: No Units

Method: 9040B

Preparation: 9040B

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Dil. Factor	Qualifier
pH	6.9	0.10	1	

Client Sample ID: PTI-MW9-045

Lab Sample ID: E9J280266-008

Hexavalent Chromium
Hexavalent Chromium

Batch: 9302232

Matrix: Water

Units: mg/L

Method: 7196A

Preparation: 7196A

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Dil. Factor	Qualifier
Hexavalent Chromium	4.0	0.50	50	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW35-045

Lab Sample ID: E9J280266-009

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9302229
Matrix: Water
Units: No Units

Method: 9040B
Preparation: 9040B

Date Sampled: 10/28/99
Date Prepared: 10/28/99
Date Analyzed: 10/28/99

Analyte	Result	RL	Dil. Factor	Qualifier
pH	6.6	0.10	1	

Client Sample ID: PTI-MW35-045

Lab Sample ID: E9J280266-009

Hexavalent Chromium
Hexavalent Chromium

Batch: 9302232
Matrix: Water
Units: mg/L

Method: 7196A
Preparation: 7196A

Date Sampled: 10/28/99
Date Prepared: 10/28/99
Date Analyzed: 10/28/99

Analyte	Result	RL	Dil. Factor	Qualifier
Hexavalent Chromium	60.5	10.0	1000	

Client: PHIBRO-TECH, INC.

Client Sample ID: PTI-MW37-045

Lab Sample ID: E9J280266-010

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9302229

Matrix: Water

Units: No Units

Method: 9040B

Preparation: 9040B

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Dil. Factor	Qualifier
pH	6.4	0.10	1	

Client Sample ID: PTI-MW37-045

Lab Sample ID: E9J280266-010

Hexavalent Chromium
Hexavalent Chromium

Batch: 9302232

Matrix: Water

Units: mg/L

Method: 7196A

Preparation: 7196A

Date Sampled: 10/28/99

Date Prepared: 10/28/99

Date Analyzed: 10/28/99

Analyte	Result	RL	Dil. Factor	Qualifier
Hexavalent Chromium	3.6	0.50	50	

Quality Control Batch Assignment Report

<u>Lab Sample ID</u>	<u>Matrix</u>	<u>Method</u>	<u>Batch ID</u>	<u>MS Run Number</u>
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Metals

E9J280266-001	WATER	6010B	9302196	9302087
E9J280266-002	WATER	6010B	9302196	9302087
E9J280266-003	WATER	6010B	9302196	9302087
E9J280266-004	WATER	6010B	9302196	9302087
E9J280266-005	WATER	6010B	9302196	9302087
E9J280266-006	WATER	6010B	9302196	9302087
E9J280266-007	WATER	6010B	9302196	9302087
E9J280266-008	WATER	6010B	9302196	9302087
E9J280266-009	WATER	6010B	9302196	9302087
E9J280266-010	WATER	6010B	9302196	9302087

GC/MS Volatiles

E9J280186-007	WATER	8260B	9302413	9302185
E9J280266-001	WATER	8260B	9302413	9302185
E9J280266-002	WATER	8260B	9302413	9302185
E9J280266-003	WATER	8260B	9302413	9302185
E9J280266-004	WATER	8260B	9302413	9302185
E9J280266-005	WATER	8260B	9302413	9302185
E9J280266-006	WATER	8260B	9305444	9305191
E9J280266-007	WATER	8260B	9305444	9305191
E9J280266-008	WATER	8260B	9302413	9302185
E9J280266-009	WATER	8260B	9302413	9302185
E9J280266-010	WATER	8260B	9302413	9302185
E9J280266-011	WATER	8260B	9302413	9302185
E9J290213-009	WATER	8260B	9305444	9305191

Quality Control Batch Assignment Report

<u>Lab Sample ID</u>	<u>Matrix</u>	<u>Method</u>	<u>Batch ID</u>	<u>MS Run Number</u>
Classical Chemistry				
E9J280266-001	WATER	7196A	9302232	
E9J280266-001		9040B	9302229	
E9J280266-002	WATER	7196A	9302232	
E9J280266-002		9040B	9302229	
E9J280266-003	WATER	7196A	9302232	
E9J280266-003		9040B	9302229	
E9J280266-004	WATER	7196A	9302232	
E9J280266-004		9040B	9302229	
E9J280266-005	WATER	7196A	9302232	
E9J280266-005		9040B	9302229	
E9J280266-006	WATER	7196A	9302232	
E9J280266-006		9040B	9302229	
E9J280266-007	WATER	7196A	9302232	
E9J280266-007		9040B	9302229	
E9J280266-008	WATER	7196A	9302232	
E9J280266-008		9040B	9302229	
E9J280266-009	WATER	7196A	9302232	
E9J280266-009		9040B	9302229	
E9J280266-010	WATER	7196A	9302232	
E9J280266-010		9040B	9302229	

Metals

Batch ID: 9302196

Inductively Coupled Plasma (6010B)

Method Blank

Lab Sample ID: E9J290000-196B

Matrix: Water

Units: mg/L

Analyte	Result	RL	Qual.	Date Analyzed
Cadmium	ND	0.0050		11/01/99
Chromium	ND	0.010		11/01/99
Copper	ND	0.025		11/01/99

Laboratory Control Sample

Lab Sample ID: E9J290000-196C

Matrix: Water

Units: mg/L

Analyte	Spike Amount	Result	% Rec.	QC Limits	Qualifier
Cadmium	0.0500	0.0500	100	80-120	
Chromium	0.200	0.207	104	80-120	
Copper	0.250	0.245	98	80-120	

Matrix Spike / Matrix Spike Duplicate

Lab Sample ID E9J280266-003S

Matrix: Water

Units: mg/L

Analyte	Sample Spike		Result		% Rec.		Control		Qualifier	
	Result	Amount	MS	MSD	MS	MSD	Limits	RPD	MS	MSD
Cadmium	0.0060	0.0500	0.0557	0.0535	99	95	80-120	4.2		
Chromium	0.15	0.200	0.350	0.336	101	94	80-120	4.2		
Copper	0.044	0.250	0.316	0.305	109	105	80-120	3.5		

Classical Chemistry

Batch ID: 9302232
Hexavalent Chromium

Method Blank

Lab Sample ID: E9J290000-232B
Matrix: Water
Units: mg/L

Analyte	Result	RL	Qual.	Date Analyzed
Hexavalent Chromium	ND	0.010		10/28/99

Laboratory Control Sample

Lab Sample ID: E9J290000-232C
Matrix: Water
Units: mg/L

Analyte	Spike Amount	Result	% Rec.	QC Limits	Qualifier
Hexavalent Chromium	0.0500	0.0493	99	80-120	

Laboratory Control Sample

Lab Sample ID: E9J290000-229C
Matrix: Water
Units: No Units

Analyte	Spike Amount	Result	% Rec.	QC Limits	Qualifier
pH	9.18	9.03	98	90-110	

GC/MS Volatiles

Batch ID: 9302413

Volatile Organics, GC/MS (8260B)

Method Blank

Lab Sample ID: E9J290000-413B

Matrix: Water

Units: ug/L

Analyte	Result	RL	Qual.	Date Analyzed
Benzene	ND	1.0		10/28/99
Bromodichloromethane	ND	1.0		10/28/99
Bromoform	ND	1.0		10/28/99
Bromomethane	ND	2.0		10/28/99
Carbon tetrachloride	ND	1.0		10/28/99
Chlorobenzene	ND	1.0		10/28/99
Dibromochloromethane	ND	1.0		10/28/99
Chloroethane	ND	2.0		10/28/99
Chloroform	ND	1.0		10/28/99
Chloromethane	ND	2.0		10/28/99
1,2-Dichlorobenzene	ND	1.0		10/28/99
1,3-Dichlorobenzene	ND	1.0		10/28/99
1,4-Dichlorobenzene	ND	1.0		10/28/99
1,1-Dichloroethane	ND	1.0		10/28/99
1,2-Dichloroethane	ND	1.0		10/28/99
1,1-Dichloroethene	ND	1.0		10/28/99
cis-1,2-Dichloroethene	ND	1.0		10/28/99
trans-1,2-Dichloroethene	ND	1.0		10/28/99
1,2-Dichloropropane	ND	1.0		10/28/99
cis-1,3-Dichloropropene	ND	1.0		10/28/99
trans-1,3-Dichloropropene	ND	1.0		10/28/99
Ethylbenzene	ND	1.0		10/28/99
Methylene chloride	ND	1.0		10/28/99
1,1,2,2-Tetrachloroethane	ND	1.0		10/28/99
Tetrachloroethene	ND	1.0		10/28/99
Toluene	ND	1.0		10/28/99
1,1,1-Trichloroethane	ND	1.0		10/28/99
1,1,2-Trichloroethane	ND	1.0		10/28/99
Trichloroethene	ND	1.0		10/28/99
Trichlorofluoromethane	ND	2.0		10/28/99
Vinyl chloride	ND	2.0		10/28/99
m-Xylene & p-Xylene	ND	1.0		10/28/99
o-Xylene	ND	1.0		10/28/99

Batch ID: 9302413

Volatile Organics, GC/MS (8260B)

Method Blank, continued

Lab Sample ID: E9J290000-413B

Matrix: Water

Units: ug/L

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	96	70-130	
1,2-Dichloroethane-d4	110	60-140	
Toluene-d8	107	70-130	

Laboratory Control Sample

Lab Sample ID: E9J290000-413C

Matrix: Water

Units: ug/L

Analyte	Spike Amount	Result	% Rec.	QC Limits	Qualifier
Benzene	10.0	10.4	104	70-130	
Chlorobenzene	10.0	10.1	101	70-130	
1,1-Dichloroethene	10.0	10.4	104	60-140	
Toluene	10.0	10.2	102	70-130	
Trichloroethene	10.0	11.5	115	70-130	
Surrogate					
Bromofluorobenzene	10.0	10.2	102	70-130	
1,2-Dichloroethane-d4	10.0	10.6	106	60-140	
Toluene-d8	10.0	10.8	108	70-130	

Quality Control Reports

Batch ID: 9302413

Volatile Organics, GC/MS (8260B)

Matrix Spike / Matrix Spike Duplicate

Lab Sample ID E9J280186-007S

Matrix: Water

Units: ug/L

Analyte	Sample Result	Spike Amount	Result		% Rec.		Control Limits	RPD	Qualifier	
			MS	MSD	MS	MSD			MS	MSD
Benzene	ND	10.0	11.2	11.3	112	113	70-130	0.71		
Chlorobenzene	ND	10.0	10.1	10.3	101	103	70-130	2.2		
1,1-Dichloroethene	ND	10.0	11.3	11.9	113	119	60-140	5.6		
Toluene	ND	10.0	10.6	10.7	106	107	70-130	0.84		
Trichloroethene	ND	10.0	10.6	10.8	106	108	70-130	2.3		

Surrogate

Bromofluorobenzene	10	10.0	10.1	10.3	101	103	70-130
1,2-Dichloroethane-d4	11	10.0	11.3	11.0	113	110	60-140
Toluene-d8	10	10.0	10.4	10.5	104	105	70-130

////////////////////////////////////

Batch ID: 9305444

Volatile Organics, GC/MS (8260B)

Method Blank

Lab Sample ID: E9K010000-444B

Matrix: Water

Units: ug/L

Analyte	Result	RL	Qual.	Date Analyzed
Benzene	ND	1.0		10/29/99
Bromodichloromethane	ND	1.0		10/29/99
Bromoform	ND	1.0		10/29/99
Bromomethane	ND	2.0		10/29/99
Carbon tetrachloride	ND	1.0		10/29/99
Chlorobenzene	ND	1.0		10/29/99
Dibromochloromethane	ND	1.0		10/29/99
Chloroethane	ND	2.0		10/29/99
Chloroform	ND	1.0		10/29/99
Chloromethane	ND	2.0		10/29/99
1,2-Dichlorobenzene	ND	1.0		10/29/99
1,3-Dichlorobenzene	ND	1.0		10/29/99
1,4-Dichlorobenzene	ND	1.0		10/29/99
1,1-Dichloroethane	ND	1.0		10/29/99
1,2-Dichloroethane	ND	1.0		10/29/99
1,1-Dichloroethene	ND	1.0		10/29/99
cis-1,2-Dichloroethene	ND	1.0		10/29/99
trans-1,2-Dichloroethene	ND	1.0		10/29/99
1,2-Dichloropropane	ND	1.0		10/29/99
cis-1,3-Dichloropropene	ND	1.0		10/29/99
trans-1,3-Dichloropropene	ND	1.0		10/29/99
Ethylbenzene	ND	1.0		10/29/99
Methylene chloride	ND	1.0		10/29/99
1,1,2,2-Tetrachloroethane	ND	1.0		10/29/99
Tetrachloroethene	ND	1.0		10/29/99
Toluene	ND	1.0		10/29/99
1,1,1-Trichloroethane	ND	1.0		10/29/99
1,1,2-Trichloroethane	ND	1.0		10/29/99
Trichloroethene	ND	1.0		10/29/99
Trichlorofluoromethane	ND	2.0		10/29/99
Vinyl chloride	ND	2.0		10/29/99
m-Xylene & p-Xylene	ND	1.0		10/29/99
o-Xylene	ND	1.0		10/29/99

Batch ID: 9305444

Volatile Organics, GC/MS (8260B)

Method Blank, continued

Lab Sample ID: E9K010000-444B

Matrix: Water

Units: ug/L

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	92	70-130	
1,2-Dichloroethane-d4	95	60-140	
Toluene-d8	103	70-130	

Laboratory Control Sample

Lab Sample ID: E9K010000-444C

Matrix: Water

Units: ug/L

Analyte	Spike Amount	Result	% Rec.	QC Limits	Qualifier
Benzene	10.0	11.5	115	70-130	
Chlorobenzene	10.0	10.4	104	70-130	
1,1-Dichloroethene	10.0	11.6	116	60-140	
Toluene	10.0	10.8	108	70-130	
Trichloroethene	10.0	11.7	117	70-130	
Surrogate					
Bromofluorobenzene	10.0	10.2	102	70-130	
1,2-Dichloroethane-d4	10.0	9.76	98	60-140	
Toluene-d8	10.0	10.8	108	70-130	

Quality Control Reports

Batch ID: 9305444

Volatile Organics, GC/MS (8260B)

Matrix Spike / Matrix Spike Duplicate

Lab Sample ID E9J290213-009S

Matrix: Water

Units: ug/L

Analyte	Sample Result	Spike Amount	Result		% Rec.		Control Limits	RPD	Qualifier	
			MS	MSD	MS	MSD			MS	MSD
1,1-Dichloroethene	ND	10.0	11.8	12.5	118	125	60-140	5.9		
Trichloroethene	ND	10.0	10.8	11.6	108	116	70-130	7.6		

Surrogate

Bromofluorobenzene	10	10.0	10.4	10.8	104	108	70-130
1,2-Dichloroethane-d4	11	10.0	11.4	11.9	114	119	60-140
Toluene-d8	11	10.0	11.1	11.2	111	112	70-130

[illegible]

Appendix C
Completed COC Forms

Chain of Custody Record



QUA-4124 0797

Client **CDM** **Suite 650** Project Manager **S. Wallin** Date **10-27-99** Chain of Custody Number **08960**

Address **18881 Von Karmann Ave** Telephone Number (Area Code)/Fax Number **949 752-5452** Lab Number _____ Page **1** of **2**

City _____ State _____ Zip Code _____ Site Contact **R. Lopez** Lab Contact **D. Suzuki** Analysis (Attach list if more space is needed)

Project Name **PTI** Carrier/Waybill Number _____

Contract/Purchase Order/Quote No.				Matrix				Containers & Preservatives								Conditions of Receipt																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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Sample I.D. No. and Description (Containers for each sample may be combined on one line)		Date	Time	Aqueous	Sed.	Soil		Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/ NaOH																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 3 months)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify)

1. Relinquished By	Date 10-27-99	Time 16:00	1. Received By	Date 10-27-99	Time 16:05
2. Relinquished By	Date 10-27-99	Time 17:00	2. Received By	Date 10/27/99	Time 17:00
3. Relinquished By	Date	Time	3. Received By	Date	Time

Chain of Custody Record



QUA-4124 0797

Client CDM		Project Manager S. Walling		Date 10-27-99	Chain of Custody Number 08961
Address Seep 1		Telephone Number (Area Code)/Fax Number		Lab Number	Page 2 of 3

City	State	Zip Code	Site Contact	Lab Contact	Analysis (Attach list if more space is needed)
Project Name			Carrier/Waybill Number		

Contract/Purchase Order/Quote No.		Matrix			Containers & Preservatives										Special Instructions/ Conditions of Receipt									
Sample I.D. No. and Description (Containers for each sample may be combined on one line)		Date	Time	Aqueous	Sed.	Soil	Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	EPA 8260 VOC	Cr-Cd-Cu										
PTI-MW6B-045		10-27-99	13:20	X						X			X		<div>24 hr Hold time</div> <div>3 40ml vort</div> <div>1000ml poly</div> <div>250ml poly</div>									
↓			↓						X					X										
PTI-MW6D-045			14:15							X			X											
↓			↓					X		X				X										
PTI-EB01-045			14:40						X				X											
↓			↓						X					X										
PTI-MW7-045			15:40							X			X											
↓			↓						X					X										

Possible Hazard Identification		Sample Disposal		(A fee may be assessed if samples are retained longer than 3 months)	
<input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown		<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months			
Turn Around Time Required		QC Requirements (Specify)			
<input type="checkbox"/> 24 Hours <input type="checkbox"/> 48 Hours <input checked="" type="checkbox"/> 7 Days <input type="checkbox"/> 14 Days <input type="checkbox"/> 21 Days <input type="checkbox"/> Other _____					
1. Relinquished By	Date 10-27-99	Time 16:00	1. Received By	Date 10-27-99	Time 16:05
2. Relinquished By	Date 10-27-99	Time 17:00	2. Received By	Date 10/27/99	Time 17:00
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments

Chain of Custody Record



QUA-4124 0797

Client DM			Project Manager S. Wallin			Date 10-28-99			Chain of Custody Number 08342		
Address 18881 Van Korman Ave Suite 600			Telephone Number (Area Code)/Fax Number 949-752-5452			Lab Number			Page 1 of 1		
City Irvine		State	Zip Code	Site Contact R. Lopez		Lab Contact D. Suzuki		Analysis (Attach list if more space is needed)			
Project Name PTI				Carrier/Waybill Number						Special Instructions/ Conditions of Receipt collected sample follows 2 in field	

Contract/Purchase Order/Quote No. 2279-11462-111 (FLI)			Matrix				Containers & Preservatives								Special Instructions/ Conditions of Receipt collected sample follows 2 in field																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
Sample I.D. No. and Description (Containers for each sample may be combined on one line)		Date	Time	Aqueous	Sed.	Soil	Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/ NaOH																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
PTI-MW-04A-045		10-28-99	8:35	X						X				X																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					</

Possible Hazard Identification				Sample Disposal				(A fee may be assessed if samples are retained longer than 3 months)			
<input type="checkbox"/> Non-Hazard	<input type="checkbox"/> Flammable	<input type="checkbox"/> Skin Irritant	<input type="checkbox"/> Poison B	<input type="checkbox"/> Unknown	<input type="checkbox"/> Return To Client	<input type="checkbox"/> Disposal By Lab	<input type="checkbox"/> Archive For _____ Months				
Turn Around Time Required				QC Requirements (Specify)							
<input type="checkbox"/> 24 Hours	<input type="checkbox"/> 48 Hours	<input type="checkbox"/> 7 Days	<input type="checkbox"/> 14 Days	<input type="checkbox"/> 21 Days	<input type="checkbox"/> Other _____						
1. Relinquished By [Signature]				Date	Time	1. Received By [Signature]				Date	Time
				10-28-99	16:00					10-28-99	16:00
2. Relinquished By [Signature]				Date	Time	2. Received By [Signature]				Date	Time
				10-28-99	17:00					10/28/99	17:00
3. Relinquished By				Date	Time	3. Received By				Date	Time

Comments

Chain of Custody Record



QUA-4124 0797

Client @DM		Project Manager S. Wallin		Date 10-28-99	Chain of Custody Number 08343
Address 1888 Von Karmann		Telephone Number (Area Code)/Fax Number 949 752-5452		Lab Number	Page 2 of 2

City Irvine	State	Zip Code	Site Contact R. Lopez	Lab Contact	Analysis (Attach list if more space is needed)
Project Name PTI			Carrier/Waybill Number		

Contract/Purchase Order/Quote No. 2279-11462-111 FLD				Matrix				Containers & Preservatives							Special Instructions/ Conditions of Receipt Crucial sample filtered in field																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Sample I.D. No. and Description (Containers for each sample may be combined on one line)				Date	Time	Aqueous	Sed.	Soil		Unpres.	H2SO4	HNO3	HCl	NaOH											ZnAc/ NaOH																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
PTI-EB02-045				10-28-99	10:45	X							X				EPA 8260 Crucial Cu+2 24 hr holding time																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					</

Possible Hazard Identification		Sample Disposal		(A lee may be assessed if samples are retained longer than 3 months)	
<input type="checkbox"/> Non-Hazard	<input type="checkbox"/> Flammable	<input type="checkbox"/> Skin Irritant	<input type="checkbox"/> Poison B	<input type="checkbox"/> Unknown	<input type="checkbox"/> Return To Client
Turn Around Time Required		QC Requirements (Specify)			
<input type="checkbox"/> 24 Hours	<input type="checkbox"/> 48 Hours	<input type="checkbox"/> 7 Days	<input type="checkbox"/> 14 Days	<input type="checkbox"/> 21 Days	<input type="checkbox"/> Other
1. Relinquished By [Signature]		Date 10-28-99	Time 16:00	1. Received By [Signature]	
2. Relinquished By [Signature]		Date 10-28-99	Time 17:00	2. Received By [Signature]	
3. Relinquished By		Date	Time	3. Received By	

Comments

Chain of Custody Record



QUA-4124 0797

Client CDM		Project Manager S. Walling		Date 10-28-99	Chain of Custody Number 08344
Address		Telephone Number (Area Code)/Fax Number		Lab Number	Page 3 of 3

City Seep	State	Zip Code	Site Contact	Lab Contact	Analysis (Attach list if more space is needed) DO NOT WRITE IN THESE SPACES 24hr holding time
Project Name			Carrier/Waybill Number		

Contract/Purchase Order/Quote No. 222-22-77-11462-111 FLID		Matrix		Containers & Preservatives										Special Instructions/ Conditions of Receipt
Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Aqueous	Sed.	Soil	Unpres.	H2SO4	HNOS	HCl	NaOH	ZnAc/NaOH			
PTI-MW35-045	10-28-99	8:05							X					
↓	↓	↓												
PTI-MW37-045	↓	14:30												
↓	↓	↓												
PTI-TB02-045	↓	—												

Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown			Sample Disposal <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months			(A fee may be assessed if samples are retained longer than 3 months)			
Turn Around Time Required <input type="checkbox"/> 24 Hours <input type="checkbox"/> 48 Hours <input type="checkbox"/> 7 Days <input type="checkbox"/> 14 Days <input type="checkbox"/> 21 Days <input type="checkbox"/> Other _____			QC Requirements (Specify)						
1. Relinquished By [Signature]			Date 10-28-99	Time 1600	1. Received By [Signature]			Date 10-28-99	Time 1600
2. Relinquished By [Signature]			Date 10-28-99	Time 1700	2. Received By [Signature]			Date 10/29/99	Time 1700
3. Relinquished By			Date	Time	3. Received By			Date	Time

Comments

DISTRIBUTION: WHITE - Stays with the Sample; CANARY - Returned to Client with Report; PINK - Field Copy

Date: 10/27/99

Quote #: 29756
Project: PTI
Date/Time Received: 10/27/99 17:00
☐ DHL ☐ Ultra-Ex ☐ Reg B.

Initial / Date
fwr 10/27

Outside Analysis(es) (Test/Lab/Date Sent Out) :

***** LEAVE NO BLANK SPACES ; USE N/A *****

[illegible]

h: HCl	s: H2SO4	na: Sodium Hydroxide	znna: Sodium Hydroxide + Zinc Acetate	n: HNO3	n/f: HNO3 field filtered
* Number VOA's w/ air bubbles present					n/f/l: HNO3 Lab filtered

Pin 10/27/99

REVIEWED BY/DATE:

0010953

Quanterra - Santa Ana

Condition Upon Receipt Anomaly Report (CUR)

Client: CDM Date/Time: 10/27/99 17:30
LIMS No: E9J270242 Initiated by: (Signature)

Affected samples		Chain of Custody #
Client ID	Lab ID	Analyses Requested
PTI-MW15-045	001	} p.s. metals
PTI-MW10-045	002	
PTI-MW13-045	003	
PTI-MW11-045	004	

CONDITION/ANOMALY/VARIANCE (CHECK ALL THAT APPLY):

<ul style="list-style-type: none"> COOLERS <ul style="list-style-type: none"> <input type="checkbox"/> Not Received, No (COC) <input type="checkbox"/> Not Received but COC (s) Available <input type="checkbox"/> Leaking <input type="checkbox"/> Other: _____ 	<ul style="list-style-type: none"> CUSTODY SEALS (COOLER(S)/CONTAINER(S)) <ul style="list-style-type: none"> <input type="checkbox"/> None <input type="checkbox"/> Not Intact <input type="checkbox"/> Other: _____
<ul style="list-style-type: none"> TEMPERATURE (SPECS $4 \pm 2^{\circ}\text{C}$) <ul style="list-style-type: none"> <input type="checkbox"/> Cooler Temp(s) _____ <input type="checkbox"/> Temperature Blank(s) _____ 	<ul style="list-style-type: none"> CHAIN OF CUSTODY (COC) <ul style="list-style-type: none"> <input type="checkbox"/> Not relinquished by Client; No date/time relinquished <input type="checkbox"/> Incomplete information provided <input type="checkbox"/> Other: _____
<ul style="list-style-type: none"> CONTAINERS <ul style="list-style-type: none"> <input type="checkbox"/> Leaking <input type="checkbox"/> Broken <input type="checkbox"/> Extra <input type="checkbox"/> Without Labels <input type="checkbox"/> VOA Vials with Headspace _____ mm <input type="checkbox"/> Other: _____ 	<ul style="list-style-type: none"> CONTAINERS LABELS <ul style="list-style-type: none"> <input type="checkbox"/> Not the same ID/info as in COC <input type="checkbox"/> Incomplete Information <ul style="list-style-type: none"> <input type="checkbox"/> Preservative <input type="checkbox"/> Collection _____ Time _____ Date <input type="checkbox"/> Markings/Info illegible <input type="checkbox"/> Torn <input type="checkbox"/> Other: _____
<ul style="list-style-type: none"> SAMPLES <ul style="list-style-type: none"> <input type="checkbox"/> Samples NOT RECEIVED but listed on COC <input type="checkbox"/> Samples received but NOT LISTED on COC <input type="checkbox"/> Logged based on Label Information <input type="checkbox"/> Logged based on info from other samples on COC <input type="checkbox"/> Logged according to Work Plan <input type="checkbox"/> Logged on HOLD UNTIL FURTHER NOTICE <input type="checkbox"/> Other: _____ 	<ul style="list-style-type: none"> <input type="checkbox"/> Will be noted on COC Client to send samples with new COC <input type="checkbox"/> Misabeled as to tests, preservatives, etc. <input type="checkbox"/> Holding time expired <input type="checkbox"/> Improper container used <input type="checkbox"/> Not preserved/Improper preservative used <input checked="" type="checkbox"/> Improper pH _____ Lab to preserve sample and document pH 3 <input type="checkbox"/> Insufficient quantities for analysis

Comments: PM was informed. The lab was requested add more HNO₃ to these samples.

Corrective Action Implemented:

☐ Client Informed: verbally on _____ By: _____ In writing on _____ By: _____
☐ Sample(s) processed "as is."
☐ Sample(s) on hold until: _____ If released, notify: _____

Sample Control Supervisor Review: (Signature) Date: 10/27/99 17:30
 Project Management Review: (Signature) Date: 10/27/99

SIGNED ORIGINAL MUST BE RETAINED IN THE PROJECT FILE

DEPENDABLE EXPRESS SERVICE, INC.

17064 Pepper Brook Way
Hacienda Heights, CA 91745

(626) 913-2273

No. 126360

Reg. ☐
Rush ☐
Exp. ☒

MESSANGER <i>Cash</i>	24 HOUR SERVICE	DATE <i>10-27-79</i>
--------------------------	-----------------	-------------------------

CHARGE TO:

Quantum

ADDRESS

1721 S. Grand

SUITE #

AUTHORIZED BY

REF

340

PICK UP FROM:

Plastic Tech

STREET AND NUMBER

8851 Dice Rd.

SUITE #

CITY

Santa Fe Springs

ZIP CODE

90670

DELIVER TO:

Quantum

STREET AND NUMBER

1721 S. Grand

SUITE #

CITY

Santa Ana

ZIP CODE

FOR OFFICE USE ONLY

RETURN: ☐ YES ☒ NO

P/U TIME *3:30*

DEL TIME *5:00*

COMMODITY

1000

RETURN

WAITING TIME *35* MIN.

WEIGHT *20* LBS.

NO. PCS. *1*

RUSH

EXP.

SPECIAL INSTRUCTIONS:

Rob 6002

ED 1001

714-521-7460

NIGHT OR HOLIDAY

WAITING TIME

EXTRA WEIGHT

SUB TOTAL

CASH ADVANCE

TOTAL

RECEIVED BY (PLEASE SIGN LEGIBLY)

X [Signature]

RETURN RECEIVED BY (PLEASE SIGN LEGIBLY)

X [Signature]

Terms and Conditions Upon Which Pick-ups and Deliveries are made

Not responsible for loss or damage (A) Unless same is reported to us in writing within fifteen (15) days. Loss limited to \$100.00 per shipment unless a higher value is declared by customer on front of this ticket at time pick-up or delivery is authorized. In which case extra rates may be charged by us for insuring the excess value. Losses adjusted on basis of invoice cost price less reasonable depreciation.

WHITE-OFFICE

YELLOW-DRIVER

PINK-CUSTOMER

QUANTERRA INC. - SANTA ANA
PROJECT RECEIPT CHECKLIST

Date: 10/28/99

Quantims Lot #: E9J280265
Client Name: CDM
Received by: Rum INTIN

Quote #: 29756
Project: PTI
Date/Time Received: ✓

Delivered by : ☐ Client ☐ Airborne ☐ Fed Ex
☐ UPS ☐ ATD ☐ Other

☐ DHL ☐ Ultra-Ex ☒ Rey B.

Custody Seal Status: ☐ Intact ☐ Broken ☒ None

Initial / Date

(PMD) 10/28

Custody Seal #(s): ☒ No Seal #

Sample Container(s): ☒ Quanterra ☐ Client ☐ N/A

Temperature(s) (COOLER/BLANK) in °C: 5.0 x 2 (CORRECTED TEMP).....

Thermometer Used : ☒ IR (Infra-red) ☐ Digital (Probe)

Samples: ☒ Intact ☐ Broken ☐ Other

Anomalies: ☒ No ☐ Yes (See Clouseau)

Labeled by

Labeling checked by

Short-Hold Notification: ☒ Ph ☒ Wet Chem ☐ Metals (Filter/Pres) ☐ Encore ☐ N/A ...

Outside Analysis(es) (Test/Lab/Date Sent Out) :

N/A

***** LEAVE NO BLANK SPACES ; USE N/A *****

[illegible]

h:HCl	s:H2SO4	na:Sodium Hydroxide	znna: Sodium Hydroxide + Zinc Acetate	n:HNO3	n/f:HNO3 field filtered
* Number VOA's w/ air bubbles present					n/f/f:HNO3 Lab filtered

LOGGED BY/DATE: (Jmw) 10/28/99

REVIEWED BY/DATE:

PRC Ver. 4 021599

0010959

Appendix D
Background Groundwater Concentrations

The City of Santa Fe Springs Presents. . .

Stargaze '99

Summer Music Festival

featuring. . .

Pepe Aguilar ★
Friday, July 9

From mariachis to the motion picture screen, Pepe Aguilar is one of the biggest Mexican stars in the Spanish speaking community. Fans will remember Pepe from his motion picture "La Sangre de un Valiente," (The Blood of the Brave) and his most recent album release "Por Mujeres Como Tu" (Because of Women Like You). His music style includes ballads, ranchera and pop. Pepe Aguilar will delight music listeners of all languages.

(Second concert to be announced)

★
★
★
**Neal McCoy
&
Lee Greenwood**
Wednesday, September 8

Hot on the heels of his top single, "The Shake," the success of his Greatest Hits CD and TNN/Music City News' Video of the Year Award, Neal McCoy is giving listeners even more to love. His latest release "Be Good At It" features songs like "Party On," "Basic Good-Bye," and "21 to 7." Neal McCoy is "hot, hot, hot" in the country music world.

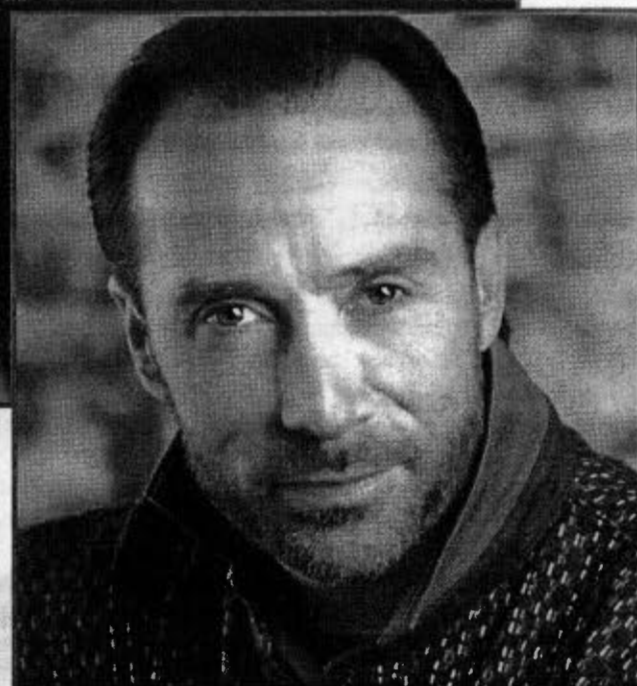
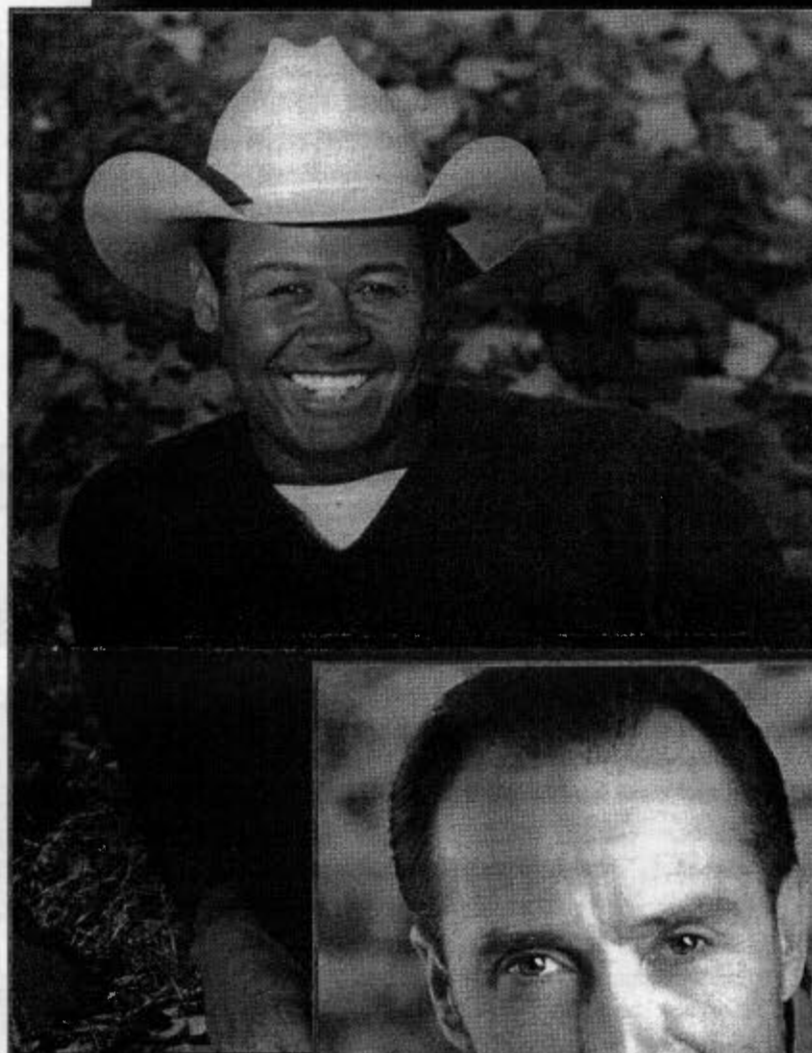
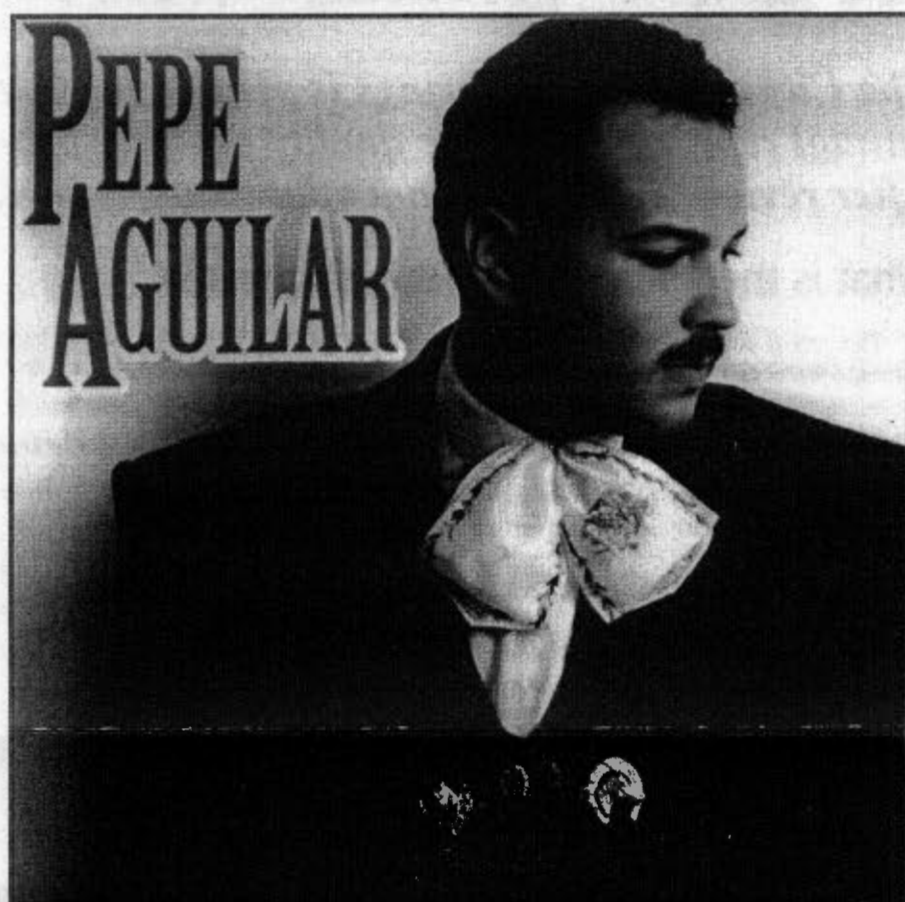
Lee Greenwood's fans include two Presidents of the United States and countless others. He is best recognized for his hit song "God Bless the USA" and gold albums entitled "Inside Out," "Somebody's Gonna Love You," and "Meant For Each Other." Country music fans won't want to miss this spectacular duel concert featuring two country artists.

Summer entertainment under the stars!

Concerts start at 8:00 p.m. and are held in an intimate, outdoor amphitheater where every seat is a great seat!

Residents and industrial residents may purchase tickets beginning Tuesday, May 18. Nonresidents may purchase tickets beginning Tuesday, May 25. Tickets may be purchased at the Town Center Box Office, 11740 E. Telegraph Road. The Box Office is open from 9:00 a.m. to 8:30 p.m., Monday through Thursday, and Friday from 9:00 a.m. to 4:30 p.m. (Note: people who work in Santa Fe Springs are considered industrial residents and may purchase tickets at resident prices with proof of employment.)

*For tickets and information, call the
Town Center Box Office at (562) 863-4896.*



	GENERAL SEATING		PREFERRED SEATING	
	Resident/ Indust. Res.	Non Resident	Resident/ Indust. Res.	Non Resident
Pepe Aguilar	\$15	\$20	\$25	\$35
Concert TBA				
Neal McCoy & Lee Greenwood	\$15	\$20	\$25	\$35



City of Santa Fe Springs 1998 Annual Water Quality Report

The City of Santa Fe Springs is pleased to provide the following Water Quality Report, an annual report card on the quality of water provided by the Santa Fe Springs Water Utility. After review, you'll find that your water is safe, drinkable and of good quality.

What is the source of my drinking water?

This report describes the drinking water quality of local groundwater sources and the Metropolitan Water District of Southern California's imported surface water from the Colorado River and the State Water Project in Northern California.

How is my drinking water tested?

Your drinking water is protected from unsafe levels of chemicals and bacteria by regularly scheduled testing of the water. Drinking water wells are tested at intervals required by the California Department of Health Services. Scheduled testing of wells is weekly, monthly, quarterly, annually or up to once every five years depending on the type of chemical, the vulnerability of the well to contamination and historic water quality information.

Central Basin Municipal Water District administers the testing program for Santa Fe Springs. A state-certified laboratory collects well samples and tests them using state-of-the-art instruments. Likewise, the Metropolitan Water District tests the quality of imported surface water.

All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Federal Environmental Protection Agency's Safe Drinking Water Hotline (800-426-4791).

What are drinking water standards?

The federal Environmental Protection Agency (EPA) sets standards that limit the amount of certain contaminants in domestic drinking water. In California, the Department of Health Services regulates drinking water quality by enforcing standards that are at least as stringent as federal EPA standards. Public Health Goals (PHGs) are set by the California Environmental Protection Agency. Historically, California standards are more stringent than their federal counterparts.

There are two types of standards that protect your water supply. Primary standards are used to protect you from chemicals that could potentially affect your health. Secondary standards regulate chemicals that affect the taste, odor and appearance of the water. Regulations establish a Maximum Contaminant Level (MCL) for each standard. Water suppliers must ensure their customers a safe supply of water by complying with MCLs. Action Levels have been established to regulate chemicals not covered by the MCLs.

How do I read the water quality report?

The information on the chart shows the results from the most recent testing performed in accordance with state and federal drinking water regulations. To review the quality of your drinking water, compare the range and MCL.

Some people may be more vulnerable to contamination in drinking water than the general population. These people should seek advice about drinking water from their health care providers. The EPA's Safe Drinking Water Hotline (800-426-4791) also provides guidelines on appropriate means to lessen the risk of infection.

If you have specific questions regarding your system's drinking water, please call (562) 868-0511.

PRIMARY STANDARDS (MANDATED FOR PUBLIC HEALTH)	GROUNDWATER		SURFACE WATER		PRIMARY MCL	PHG	MAJOR SOURCES IN DRINKING WATER	
	AVERAGE	RANGE	AVERAGE	RANGE				
CLARITY								
TURBIDITY (ntu) (a)	0.1	0.1-0.4	0.07	0.05-0.08	TT	NONE	Soil runoff	
MICROBIOLOGICAL (% POSITIVE)								
TOTAL COLIFORM BACTERIA (a)	0	0	0.08	0-0.08	5	0	Naturally present in the environment	
No. of Acute Violations	0	0	0	0				
ORGANIC CHEMICALS - µg/l (h)								
TETRACHLOROETHYLENE - PCE	0.2	ND-1.1	ND	ND	5	0	Industrial discharge	
TRICHLOROETHYLENE - TCE	0.4	ND-1.3	ND	ND	5	0	Industrial discharge	
TRICHALOMETHANES, TOTAL-THMS (a) (b)	4.4	41-52	37	28-60	100	0	By-product of drinking water chlorination	
INORGANICS								
DATE SAMPLED (e)								
ARSENIC (µg/l)	1996-1998	3.1	ND-7.2	2.4	1.3-3.0	50	NONE	Erosion of natural deposits
BARIUM (µg/l)	1996-1998	ND	ND	85	80-89	1000	2000	Erosion of natural deposits
COPPER (mg/l)	1998	0.34 (c)	ND-0.67	ND (c)	ND-0.01	1.3 AL (d)	1.7 (f)	Corrosion of domestic plumbing
FLUORIDE (mg/l)	1996-1998	0.31	0.29-0.32	0.29	0.20-0.35	2	1 (f)	Erosion of natural deposits
LEAD (µg/l)	1998	<5 (c)	<5	ND (c)	ND	15 AL (d)	2 (f)	Corrosion of domestic plumbing
NICKEL (µg/l)	1996-1998	ND	ND	2	2	100	NONE	Erosion of natural deposits
NITRITE (mg/l as N)	1998	4.6	ND-8.6 (i)	0.2	0.1-0.3	10	10 (f)	Agricultural runoff; sewage; erosion of natural deposits
ALUMINUM (µg/l)	1996-1998	ND	ND	135	76-240	1000	NONE	Erosion of natural deposits
RADIOLOGICAL - pCi/l								
DATE SAMPLED (e)								
GROSS ALPHA	1996-1998	2.8	ND-5.6	6.6	ND-11.7	15	0	Erosion of natural deposits
GROSS BETA		NA	NA	7.3	1.2-11.2	50	0	Decay of natural and man-made deposits
URANIUM	1996-1998	5.3	4.5-6.0	4.7	3.3-5.7	20	0	Erosion of natural deposits
RADIUM-226		NA	NA	0.6	ND-2.8	5	0	Erosion of natural deposits
RADIUM-228		NA	NA	0.5	ND-1.6	5	0	Erosion of natural deposits
STRONTIUM-90		NA	NA	ND	ND-1.3	8	0	Erosion of natural deposits
SECONDARY STANDARDS	GROUNDWATER		SURFACE WATER		SECONDARY	PHG		
	AVERAGE	RANGE	AVERAGE	RANGE	MCL			
CHLORIDE (mg/l)	60	18-87	76	62-886	250-600	NONE		
UNITS OF COLOR (a)	<3	<3	2	1-3	15	NONE		
THRESHOLD ODOR NO. (ton) (a)	1	1-2	(g)	(g)	3	NONE		
IRON (µg/l)	54	ND-324	ND	ND	300	NONE		
pH (std unit)	7.8	7.0-8.5	8.0	8.0-8.1	6.5-8.5	NONE		
CONDUCTIVITY (µmhos/cm)	829	390-1130	879	715-995	900-2200	NONE		
SULFATE (mg/l)	158	59-264	209	153-250	250-600	NONE		
TOTAL DISSOLVED SOLIDS (mg/l)	533	250-728	540	429-622	500-1500	NONE		
ADDITIONAL CONSTITUENTS	GROUNDWATER		SURFACE WATER			PHG		
	AVERAGE	RANGE	AVERAGE	RANGE				
TOTAL HARDNESS (mg/l)	290	37-406	259	206-301	-	NONE		
CALCIUM (mg/l)	87	15-130	64	51-75	-	NONE		
MAGNESIUM (mg/l)	22	19-27	24	19-28	-	NONE		
SODIUM (mg/l)	67	39-111	81	64-93	-	NONE		
POTASSIUM (mg/l)	3.8	1.4-5.6	3.9	3.5-4.6	-	NONE		
HALOACETIC ACIDS (µg/l)	-	-	24	13-40	-	NONE		
HALOACETONITRILES (µg/l)	-	-	8.2	6.1-12.0	-	NONE		
CHLOROPICRIN (µg/l)	-	-	ND	ND	-	NONE		
HALOKETONES (µg/l)	-	-	1.5	0.7-3.2	-	NONE		
CHLORAL HYDRATE (µg/l)	-	-	4.1	1.5-6.8	-	NONE		
TOTAL ORGANIC HALOGENS (TOX) (µg/l)	-	-	123	86-175	-	NONE		
CYANOGEN CHLORIDE (µg/l)	-	-	2.1	1.7-2.6	-	NONE		

DEFINITIONS

MAXIMUM CONTAMINANT LEVEL (MCL): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLG as feasible using the best available treatment technology.

MAXIMUM CONTAMINANT LEVEL GOAL (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health.

PUBLIC HEALTH GOAL (PHG): The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

TREATMENT TECHNIQUE (TT): A required process intended to reduce the level of a contaminant in drinking water.

ACTION LEVEL (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

PRIMARY DRINKING STANDARD: Primary MCLs, specific treatment techniques adopted in lieu of primary MCLs, and monitoring and reporting requirements for MCLs that are specified in regulations.

mg/l = MILLIGRAMS PER LITER (Parts per million)

µg/l = MICROGRAMS PER LITER (Parts per billion)

µmhos/cm = MICROMHOS PER CENTIMETER

< = CONSTITUENT NOT DETECTED AT THE REPORTING LIMIT

pCi/l = picoCuries PER LITER

ND = CONSTITUENT NOT DETECTED AT THE REPORTING LIMIT

NA = CONSTITUENT NOT ANALYZED

(a) Samples for these constituents were collected from points in the distribution system.

(b) Average and range calculated by running average.

(c) Values represent the 90th percentile of results from the most recent sampling event at customer's taps.

(d) Action level based on results from samples collected at selected customer's taps.

(e) Indicates dates sampled for groundwater sources only.

(f) California Public Health Goal (PHG). Other advisory levels listed in this column are federal Maximum Contaminant Level Goals (MCLGs).

(g) Metropolitan Water District of Southern California uses a flavor/flavor-profile test that more accurately detects odors.

(h) Up to 65 regulated and unregulated organics were analyzed. Only those detected at or above the reporting limit are listed.

(i) Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that lead levels at your home may be higher than at other homes in the community as a result of materials on your home's plumbing. If you are concerned about elevated levels in your home's water, you may wish to have your water tested and flush your tap for 30 seconds to 2 minutes before using tap water. Additional information is available from the Safe Drinking Water Hotline (800-426-4791).

Appendix E

Statistical Analysis

Appendix E-1
Upper Tolerance Level Calculations

SUMMARY OF UPPER TOLERANCE LEVEL CALCULATIONS

Quarterly Background Data: January 1989 to October 1999

Southern California Chemical

POISSON DISTRIBUTED UPPER TOLERANCE LEVEL

COMPOUND	Hexa Chromium	Total Chromium	Cadmium	Copper	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Trichloroethene
Percent Detected	2.3%	9.1%	2.3%	25.0%	2.3%	9.1%	29.5%	31.8%	NOT
Sample number(n)	44	44	44	44	44	44	44	44	CALC.
Tn	0.5480	0.3961	0.1234	0.6493	13.6550	26.1050	40.7050	73.9550	
2Tn+2	3.10	2.79	2.25	3.30	29.31	54.21	83.41	149.91	
Chi Squared @95% of dist	7.81	5.99	5.99	7.81	42.56	72.15	105.27	178.49	
lamda Tn	0.275	0.190	0.153	0.293	14.174	44.448	99.777	304.054	
Two time Lamda Tn	0.550	0.380	0.306	0.586	28.349	88.896	199.553	608.108	
Beta cov. @95%, deg fr.	4	4	3	4	41	112	234	666	
k, from 2k+2 deg fr.	1.00	1.00	0.50	1.00	19.50	55.00	116.00	332.00	

AITCHISON ADJUSTMENT AND CALCULATION OF UPPER TOLERANCE LEVELS

Number of ND(d)	NOT	40	NOT	33	NOT	40	31	30	NO ADJ. REQ.
Number of values(n)	CALC.	44	CALC.	44	CALC.	44	44	44	
Mean of det values		0.0475		0.029		1.650	1.977	4.050	
STD of det values		0.041		0.010		0.420	0.738	1.435	
Atch. Adj. mean/mean(1)		0.004		0.007		0.150	0.584	1.289	11.907
Atch. Adj. std./std. (1)		0.018		0.014		0.493	0.992	2.065	5.337
K for Tolerance Limit		2.353		1.812		2.353	1.782	1.771	1.681
Adjusted Tol. Limit		0.046		0.032		1.309	2.353	4.945	
Unadjusted Tol. Limit									20.878

(1) Unadjusted mean and std. used to compute upper tolerance level for TCE

Appendix E-2
Shapiro-Wilk Normality Tests

Well	d	Value	Ln_value
MW-11	BEN	0.05	-2.996
MW-11	BEN	0.05	-2.996
MW-11	BEN	0.05	-2.996
MW-11	BEN	0.05	-2.996
MW-11	BEN	0.05	-2.996
MW-11	BEN	0.5	-0.693
MW-11	BEN	0.5	-0.693
MW-11	BEN	0.5	-0.693
MW-11	BEN	0.5	-0.693
MW-11	BEN	0.5	-0.693
MW-11	BEN	0.5	-0.693
MW-11	BEN	0.5	-0.693
MW-11	BEN	0.5	-0.693
MW-11	BEN	0.5	-0.690
MW-11	BEN	1	0.000
MW-11	BEN	1.2	0.182
MW-11	BEN	2.5	0.916
MW-11	BEN	5	1.609
MW-11	BEN	5	1.609
MW-11	BEN	7	1.946
MW-11	BEN	25	3.219
MW-11	BEN	500	6.215
MW-11	BEN	10	2.303
MW-11	BEN	50	3.912
MW-11	BEN	2.5	0.916
MW-11	BEN	0.5	-0.693
MW-11	BEN	25	3.219
MW-11	BEN	25	3.219
MW-11	BEN	10	2.303
MW-11	BEN	0.5	-0.693
MW-11	BEN	0.5	-0.693
MW-11	BEN	0.5	-0.693
MW-11	BEN	2.5	0.916
MW-11	BEN	2.5	0.916
MW-11	BEN	2.5	0.916
MW-11	BEN	12	2.485
MW-11	BEN	1.2	0.182
MW-11	BEN	0.5	-0.693
MW-11	BEN	5	3.219
MW-11	BEN	6.2	1.825
MW-11	BEN	25	3.219
MW-11	BEN	10	2.303
MW-11	BEN	10	2.303
MW-11	CD	0.0027	-5.915
MW-11	CD	0.003	-5.809
MW-11	CD	0.005	-5.298
MW-11	CD	0.005	-5.298
MW-11	CD	0.005	-5.298
MW-11	CD	0.005	-5.298
MW-11	CD	0.005	-5.298
MW-11	CD	0.005	-5.298
MW-11	CD	0.005	-5.298
MW-11	CD	0.005	-5.298
MW-11	CD	0.005	-5.298
MW-11	CD	0.005	-5.298
MW-11	CD	0.005	-5.298
MW-11	CD	0.005	-5.298
MW-11	CD	0.005	-5.298
MW-11	CD	0.005	-5.298

MW-11 Benzene

Log Normal

	Column1
Shapiro-Wilk W Statistic	0.93838278
p-value	0.02277015
Count	43
Normal	
	Column1
Shapiro-Wilk W Statistic	0.21044278
p-value	5.0958E-14
Count	44

[illegible]

MW-11 Cadmium

Log Normal

	Column1
Shapiro-Wilk W Statistic	0.36872756
p-value	1.6437E-12
Count	44
Normal	
	Column1
Shapiro-Wilk W Statistic	0.64335249
p-value	4.2976E-09
Count	44

S-WSCC

Well	d	Value	Ln_value		
MW-11	CU	0.023	-3.772		
MW-11	CU	0.02	-3.912		
MW-11	CU	0.02	-3.912	Log Normal	
MW-11	CU	0.029	-3.540		Column1
MW-11	CU	0.02	-3.912	Shapiro-Wilk W Statistic	0.52263284
MW-11	CU	0.15	-1.897	p-value	9.2445E-11
MW-11	CU	0.1	-2.303	Count	44
MW-11	CU	0.02	-3.912		
MW-11	CU	0.077	-2.564	Normal	
MW-11	CU	0.02	-3.912		Column1
MW-11	CU	0.041	3.219	Shapiro-Wilk W Statistic	0.57622962
MW-11	CU	0.02	-3.912	p-value	4.6399E-10
MW-11	CU	0.025	-3.689	Count	44
MW-11	CU	0.025	-3.689		
MW-11	CU	0.025	-3.689		
MW-11	EBN	1	0.000		
MW-11	EBN	1	0.000		
MW-11	EBN	1.8	0.588		
MW-11	EBN	2	0.693		
MW-11	EBN	2.1	0.742		
MW-11	EBN	2.5	0.916		
MW-11	EBN	4.5	1.500		
MW-11	EBN	10	2.303		
MW-11	EBN	11	2.398		
MW-11	EBN	17	2.833		
MW-11	EBN	43	3.761		
MW-11	EBN	83	4.419		
MW-11	EBN	110	4.701		
MW-11	EBN	130	4.868		
MW-11	EBN	200	5.298		
MW-11	EBN	230	5.438		
MW-11	EBN	370	5.914		
MW-11	EBN	520	6.254		
MW-11	EBN	1000	6.908		
MW-11	EBN	2000	7.601		
MW-11	EBN	2600	7.863		
MW-11	EBN	3000	8.006		
MW-11	EBN	3300	8.102		
MW-11	EBN	4700	8.455		
MW-11	EBN	850	6.745		
MW-11	EBN	1900	7.550		
MW-11	EBN	160	5.075		
MW-11	EBN	5.8	1.758		
MW-11	EBN	460	6.131		
MW-11	EBN	1100	7.003		
MW-11	EBN	460	6.131		
MW-11	EBN	20	2.996		
MW-11	EBN	84	4.431		
MW-11	EBN	120	4.787	Log Normal	
MW-11	EBN	8.3	2.116		Column1
MW-11	EBN	5	1.609	Shapiro-Wilk W Statistic	0.94780672
MW-11	EBN	1800	7.496	p-value	0.05391793
MW-11	EBN	150	5.011	Count	42
MW-11	EBN	41	3.714	Normal	
MW-11	EBN	10	3.219		Column1
MW-11	EBN	750	6.620	Shapiro-Wilk W Statistic	0.66633227
MW-11	EBN	1600	7.378	p-value	9.8061E-09
MW-11	EBN	85	4.443	Count	44
MW-11	EBN	480	6.174		

Log Normal	
	Column1
Shapiro-Wilk W Statistic	0.34780398
p-value	1.0044E-12
Count	44
Normal	
	Column1
Shapiro-Wilk W Statistic	0.42686293
p-value	6.8817E-12
Count	44

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S-WSCC

Well	d	Value	Ln_value		
MW-11	TCR	0.01	-4.605		
MW-11	TCR	0.01	-4.605		
MW-11	TCR	0.01	-4.605		
MW-11	TCR	0.01	-4.605		
MW-11	TCR	0.01	-4.605	Column1	
MW-11	TCR	0.01	-4.605	Shapiro-Wilk W Statistic	0.45544407
MW-11	TCR	0.01	-4.605	p-value	1.4446E-11
MW-11	TCR	0.01	-4.605	Count	44
MW-11	TCR	0.01	-4.605		
MW-11	TCR	0.01	3.219	Column1	
MW-11	TCR	0.01	-4.605	Shapiro-Wilk W Statistic	0.57626736
MW-11	TCR	0.01	-4.605	p-value	4.6453E-10
MW-11	TCR	0.01	-4.605	Count	44
MW-11	TCR	0.02	-3.912		
MW-11	TOL	0.05	-2.996		
MW-11	TOL	0.05	-2.996		
MW-11	TOL	0.5	-0.693		
MW-11	TOL	1	0.000		
MW-11	TOL	1	0.000		
MW-11	TOL	1	0.000		
MW-11	TOL	1	0.000		
MW-11	TOL	1	0.000		
MW-11	TOL	1.7	0.531		
MW-11	TOL	2.5	0.916		
MW-11	TOL	2.5	0.916		
MW-11	TOL	2.6	0.956		
MW-11	TOL	5	1.609		
MW-11	TOL	7.3	1.988		
MW-11	TOL	10	2.303		
MW-11	TOL	10	2.303		
MW-11	TOL	57	4.043		
MW-11	TOL	140	4.942		
MW-11	TOL	440	6.087		
MW-11	TOL	7500	8.923		
MW-11	TOL	8500	9.048		
MW-11	TOL	15000	9.616		
MW-11	TOL	15000	9.616		
MW-11	TOL	660	6.492		
MW-11	TOL	100	4.605		
MW-11	TOL	5	1.609		
MW-11	TOL	1	0.000		
MW-11	TOL	520	6.254		
MW-11	TOL	160	5.075		
MW-11	TOL	20	2.996		
MW-11	TOL	1.9	0.642		
MW-11	TOL	9.4	2.241		
MW-11	TOL	5	1.609		
MW-11	TOL	5	1.609		
MW-11	TOL	5	1.609	Column1	
MW-11	TOL	770	6.646	Shapiro-Wilk W Statistic	0.95160156
MW-11	TOL	63	4.143	p-value	0.10868335
MW-11	TOL	2.5	0.916	Count	37
MW-11	TOL	10	3.219		
MW-11	TOL	260	5.561	Column1	
MW-11	TOL	670	6.507	Shapiro-Wilk W Statistic	0.36830084
MW-11	TOL	10	2.303	p-value	2.2745E-12
MW-11	TOL	10	2.303	Count	43
MW-11	TX	0.05	-2.996		
MW-11	TX	0.05	-2.996		

S-WSCC

Well	d	Value	Ln_value
MW-11	TX	1	0.000
MW-11	TX	1	0.000
MW-11	TX	1	0.000
MW-11	TX	1.5	0.406
MW-11	TX	1.6	0.470
MW-11	TX	2.3	0.833
MW-11	TX	2.5	0.916
MW-11	TX	2.8	1.030
MW-11	TX	3.1	1.131
MW-11	TX	6.4	1.856
MW-11	TX	10	2.303
MW-11	TX	10	2.303
MW-11	TX	26	3.258
MW-11	TX	90	4.500
MW-11	TX	150	5.011
MW-11	TX	220	5.394
MW-11	TX	660	6.492
MW-11	TX	760	6.633
MW-11	TX	7500	8.923
MW-11	TX	10000	9.210
MW-11	TX	11000	9.306
MW-11	TX	12000	9.393
MW-11	TX	1100	7.003
MW-11	TX	1000	6.908
MW-11	TX	37	3.611
MW-11	TX	2.2	0.788
MW-11	TX	1000	6.908
MW-11	TX	1400	7.244
MW-11	TX	290	5.670
MW-11	TX	8	2.079
MW-11	TX	88	4.477
MW-11	TX	8.2	2.104
MW-11	TX	5	1.609
MW-11	TX	5	1.609
MW-11	TX	2200	7.696
MW-11	TX	210	5.347
MW-11	TX	4.8	1.569
MW-11	TX	10	3.219
MW-11	TX	970	6.877
MW-11	TX	1270	7.147
MW-11	TX	10	2.303
MW-11	TX	52	3.951
MW-14S	BEN	0.5	-0.693
MW-14S	BEN	0.5	-0.693
MW-14S	BEN	0.5	-0.693
MW-14S	BEN	0.5	-0.693
MW-14S	BEN	0.5	-0.693
MW-14S	BEN	0.5	-0.693
MW-14S	BEN	0.5	-0.693
MW-14S	BEN	0.5	-0.693
MW-14S	BEN	0.5	-0.693
MW-14S	BEN	0.5	-0.693
MW-14S	BEN	0.5	-0.693
MW-14S	BEN	0.5	-0.693
MW-14S	BEN	0.53	-0.630
MW-14S	BEN	0.6	-0.511
MW-14S	BEN	1	0.000
MW-14S	BEN	1	0.000

Column1

Shapiro-Wilk W Statistic	0.95643562
p-value	0.1178994
Count	41

Column1

Shapiro-Wilk W Statistic	0.44802727
p-value	1.1887E-11
Count	44

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S-WSCC

[illegible]

S-WSCC

Well	d	Value	Ln_value		
MW-14S	EBN	20	2.996	p-value	0.3561652
MW-14S	EBN	19	2.944	Count	29
MW-14S	EBN	1500	7.313		
MW-14S	EBN	18	2.890		
MW-14S	EBN	120	3.219	Column1	
MW-14S	EBN	77	4.344	Shapiro-Wilk W Statistic	0.52740499
MW-14S	EBN	820	6.709	p-value	1.3178E-09
MW-14S	EBN	3000	8.006	Count	36
MW-14S	EBN	120	4.787		
MW-14S	HCR	0.02	-3.912		
MW-14S	HCR	0.02	-3.912		
MW-14S	HCR	0.02	-3.912		
MW-14S	HCR	0.02	-3.912		
MW-14S	HCR	0.02	-3.912		
MW-14S	HCR	0.02	-3.912		
MW-14S	HCR	0.035	-3.350		
MW-14S	HCR	0.056	-2.882		
MW-14S	HCR	0.1	-2.303		
MW-14S	HCR	0.13	-2.040		
MW-14S	HCR	0.13	-2.040		
MW-14S	HCR	0.16	-1.833		
MW-14S	HCR	0.27	-1.309		
MW-14S	HCR	0.39	-0.942		
MW-14S	HCR	0.4	-0.916		
MW-14S	HCR	3.2	1.163		
MW-14S	HCR	0.02	-3.912		
MW-14S	HCR	0.02	-3.912		
MW-14S	HCR	0.022	-3.817		
MW-14S	HCR	0.02	-3.912		
MW-14S	HCR	0.021	-3.863		
MW-14S	HCR	0.01	-4.605		
MW-14S	HCR	0.052	-2.957		
MW-14S	HCR	0.024	-3.730		
MW-14S	HCR	0.02	-3.912	Column1	
MW-14S	HCR	0.02	-3.912	Shapiro-Wilk W Statistic	0.72081793
MW-14S	HCR	0.1	-2.303	p-value	6.1065E-07
MW-14S	HCR	0.02	-3.912	Count	36
MW-14S	HCR	0.02	-3.912		
MW-14S	HCR	0.02	-3.912	Column1	
MW-14S	HCR	0.032	3.219	Shapiro-Wilk W Statistic	0.2604568
MW-14S	HCR	0.058	-2.847	p-value	2.8059E-12
MW-14S	HCR	0.01	-4.605	Count	36
MW-14S	HCR	0.02	-3.912		
MW-14S	HCR	0.035	-3.352		
MW-14S	TCE	15	2.708		
MW-14S	TCE	18	2.890		
MW-14S	TCE	21	3.045		
MW-14S	TCE	25	3.219		
MW-14S	TCE	25	3.219		
MW-14S	TCE	29	3.367		
MW-14S	TCE	44	3.784		
MW-14S	TCE	55	4.007		
MW-14S	TCE	56	4.025		
MW-14S	TCE	56	4.025		
MW-14S	TCE	58	4.060		
MW-14S	TCE	59	4.078		
MW-14S	TCE	71	4.263		
MW-14S	TCE	81	4.394		

S-WSCC

Well	d	Value	Ln_value
MW-14S	TCE	84	4.431
MW-14S	TCE	108	4.682
MW-14S	TCE	180	5.193
MW-14S	TCE	20	2.996
MW-14S	TCE	22	3.091
MW-14S	TCE	35	3.555
MW-14S	TCE	42	3.738
MW-14S	TCE	51	3.932
MW-14S	TCE	37	3.611
MW-14S	TCE	61	4.111
MW-14S	TCE	90	4.500
MW-14S	TCE	45	3.807
MW-14S	TCE	35	3.555
MW-14S	TCE	57	4.043
MW-14S	TCE	50	3.912
MW-14S	TCE	38	3.638
MW-14S	TCE	18	2.890
MW-14S	TCE	62	3.219
MW-14S	TCE	98	4.585
MW-14S	TCE	84	4.431
MW-14S	TCE	74	4.304
MW-14S	TCE	180	5.193
MW-14S	TCR	0.01	-4.605
MW-14S	TCR	0.016	-4.135
MW-14S	TCR	0.018	-4.017
MW-14S	TCR	0.02	-3.912
MW-14S	TCR	0.022	-3.817
MW-14S	TCR	0.064	-2.740
MW-14S	TCR	0.15	-1.897
MW-14S	TCR	0.16	-1.833
MW-14S	TCR	0.2	-1.609
MW-14S	TCR	0.23	-1.470
MW-14S	TCR	0.24	-1.427
MW-14S	TCR	0.31	-1.171
MW-14S	TCR	0.33	-1.109
MW-14S	TCR	0.41	-0.892
MW-14S	TCR	0.54	-0.616
MW-14S	TCR	0.94	-0.062
MW-14S	TCR	2.2	0.789
MW-14S	TCR	0.01	-4.605
MW-14S	TCR	0.01	-4.605
MW-14S	TCR	0.046	-3.079
MW-14S	TCR	0.034	-3.381
MW-14S	TCR	0.028	-3.576
MW-14S	TCR	0.069	-2.674
MW-14S	TCR	0.082	-2.501
MW-14S	TCR	0.031	-3.474
MW-14S	TCR	0.032	-3.442
MW-14S	TCR	0.016	-4.135
MW-14S	TCR	0.013	-4.343
MW-14S	TCR	0.018	-4.017
MW-14S	TCR	0.018	-4.017
MW-14S	TCR	0.01	-4.605
MW-14S	TCR	0.044	3.219
MW-14S	TCR	0.032	-3.442
MW-14S	TCR	0.01	-4.605
MW-14S	TCR	0.01	-4.605
MW-14S	TCR	0.15	-1.897
MW-14S	TOL	0.5	-0.693

			Column1
Shapiro-Wilk W Statistic	0.97445214		
p-value	0.55889148		
Count	36		

			Column1
Shapiro-Wilk W Statistic	0.82544502		
p-value	5.4384E-05		
Count	36		

			Column1
Shapiro-Wilk W Statistic	0.879672		
p-value	0.00099323		
Count	36		

			Column1
Shapiro-Wilk W Statistic	0.46168054		
p-value	2.4063E-10		
Count	36		

S-WSCC

Well	d	Value	Ln value
MW-14S	TOL	1	0.000
MW-14S	TOL	1	0.000
MW-14S	TOL	1	0.000
MW-14S	TOL	1	0.000
MW-14S	TOL	1	0.000
MW-14S	TOL	1	0.000
MW-14S	TOL	1	0.000
MW-14S	TOL	1	0.000
MW-14S	TOL	1	0.000
MW-14S	TOL	1	0.000
MW-14S	TOL	1	0.000
MW-14S	TOL	1	0.000
MW-14S	TOL	1.3	0.262
MW-14S	TOL	24	3.178
MW-14S	TOL	76	4.331
MW-14S	TOL	2.8	1.030
MW-14S	TOL	1	0.000
MW-14S	TOL	4.7	1.548
MW-14S	TOL	54	3.989
MW-14S	TOL	1	0.000
MW-14S	TOL	1	0.000
MW-14S	TOL	5	1.609
MW-14S	TOL	2.9	1.065
MW-14S	TOL	1	0.000
MW-14S	TOL	1	0.000
MW-14S	TOL	1.1	0.095
MW-14S	TOL	1	0.000
MW-14S	TOL	1	0.000
MW-14S	TOL	2.5	3.219
MW-14S	TOL	2	0.693
MW-14S	TOL	12	2.485
MW-14S	TOL	50	3.912
MW-14S	TOL	5	1.609
MW-14S	TX	0.5	-0.693
MW-14S	TX	1	0.000
MW-14S	TX	1	0.000
MW-14S	TX	1	0.000
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MW-14S	TX	1	0.000
MW-14S	TX	1	0.000
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MW-14S	TX	1	0.000
MW-14S	TX	1	0.000
MW-14S	TX	1.4	0.337
MW-14S	TX	3.7	1.308
MW-14S	TX	3.8	1.335
MW-14S	TX	55	4.007
MW-14S	TX	5900	8.683
MW-14S	TX	190	5.247
MW-14S	TX	12	2.485
MW-14S	TX	2	0.693
MW-14S	TX	58	4.060
MW-14S	TX	110	4.700
MW-14S	TX	10	2.303
MW-14S	TX	2.9	1.065
MW-14S	TX	5	1.609

Column1	
Shapiro-Wilk W Statistic	0.95090437
p-value	0.53880681
Count	15
Column1	
Shapiro-Wilk W Statistic	0.44432359
p-value	2.2451E-10
Count	35

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Well	d	Value	Ln_value		
MW-15S	CU	0.02	-3.912	Shapiro-Wilk W Statistic	0.31219899
MW-15S	CU	0.025	-3.689	p-value	5.5106E-12
MW-15S	CU	0.025	-3.689	Count	37
MW-15S	CU	0.025	-3.689		
MW-15S	EBN	0.5	-0.693		
MW-15S	EBN	0.5	-0.693		
MW-15S	EBN	0.5	-0.693		
MW-15S	EBN	1	0.000		
MW-15S	EBN	1	0.000		
MW-15S	EBN	1	0.000		
MW-15S	EBN	1	0.000		
MW-15S	EBN	1	0.000		
MW-15S	EBN	1	0.000		
MW-15S	EBN	1	0.000		
MW-15S	EBN	1	0.000		
MW-15S	EBN	1	0.000		
MW-15S	EBN	1	0.000		
MW-15S	EBN	1	0.000		
MW-15S	EBN	1.6	0.470		
MW-15S	EBN	10	2.303		
MW-15S	EBN	64	4.159		
MW-15S	EBN	82	4.407		
MW-15S	EBN	18	2.890		
MW-15S	EBN	1	0.000		
MW-15S	EBN	25	3.219		
MW-15S	EBN	40	3.689		
MW-15S	EBN	9.7	2.272		
MW-15S	EBN	2.9	1.065		
MW-15S	EBN	69	4.234		
MW-15S	EBN	21	3.045	Column1	
MW-15S	EBN	8.2	2.104	Shapiro-Wilk W Statistic	0.87394918
MW-15S	EBN	17	2.833	p-value	0.00629241
MW-15S	EBN	12	2.485	Count	24
MW-15S	EBN	60	4.094		
MW-15S	EBN	9.8	2.282		
MW-15S	EBN	45	3.219	Column1	
MW-15S	EBN	19	2.944	Shapiro-Wilk W Statistic	0.73122761
MW-15S	EBN	23	3.135	p-value	7.021E-07
MW-15S	EBN	29	3.367	Count	37
MW-15S	EBN	12	2.485		
MW-15S	HCR	0.02	-3.912		
MW-15S	HCR	0.02	-3.912		
MW-15S	HCR	0.02	-3.912		
MW-15S	HCR	0.02	-3.912		
MW-15S	HCR	0.02	-3.912		
MW-15S	HCR	0.02	-3.912		
MW-15S	HCR	0.02	-3.912		
MW-15S	HCR	0.02	-3.912		
MW-15S	HCR	0.02	-3.912		
MW-15S	HCR	0.02	-3.912		
MW-15S	HCR	0.02	-3.912		
MW-15S	HCR	0.02	-3.912		
MW-15S	HCR	0.02	-3.910		
MW-15S	HCR	0.04	-3.219		
MW-15S	HCR	0.051	-2.976		
MW-15S	HCR	0.048	-3.037		

S-WSCC

Well	d	Value	Ln value
MW-15S	HCR	0.02	-3.912
MW-15S	HCR	0.02	-3.912
MW-15S	HCR	0.02	-3.912
MW-15S	HCR	0.02	-3.912
MW-15S	HCR	0.02	-3.912
MW-15S	HCR	0.01	-4.605
MW-15S	HCR	0.01	-4.605
MW-15S	HCR	0.02	-3.912
Column1			
MW-15S	HCR	0.02	-3.912
MW-15S	HCR	0.02	-3.912
MW-15S	HCR	0.02	-3.912
MW-15S	HCR	0.02	-3.912
Shapiro-Wilk W Statistic			
0.32459788			
p-value			
7.1718E-12			
Count			
37			
MW-15S	HCR	0.02	-3.912
MW-15S	HCR	0.02	-3.912
MW-15S	HCR	0.02	-3.912
Column1			
MW-15S	HCR	0.02	3.219
MW-15S	HCR	0.024	-3.730
MW-15S	HCR	0.01	-4.605
Shapiro-Wilk W Statistic			
0.540535			
p-value			
1.3615E-09			
Count			
37			
MW-15S	HCR	0.02	-3.912
MW-15S	HCR	0.014	-4.269
MW-15S	TCE	1	0.000
MW-15S	TCE	1.9	0.642
MW-15S	TCE	2.1	0.742
MW-15S	TCE	2.4	0.876
MW-15S	TCE	2.9	1.065
MW-15S	TCE	3.1	1.131
MW-15S	TCE	3.2	1.163
MW-15S	TCE	4.1	1.411
MW-15S	TCE	4.6	1.526
MW-15S	TCE	6	1.790
MW-15S	TCE	9	2.197
MW-15S	TCE	13	2.565
MW-15S	TCE	13	2.565
MW-15S	TCE	15	2.708
MW-15S	TCE	17	2.833
MW-15S	TCE	21	3.045
MW-15S	TCE	28	3.332
MW-15S	TCE	3.7	1.308
MW-15S	TCE	2.8	1.030
MW-15S	TCE	5.2	1.649
MW-15S	TCE	3.9	1.361
MW-15S	TCE	3.8	1.335
MW-15S	TCE	2.8	1.030
MW-15S	TCE	3.2	1.163
MW-15S	TCE	5.3	1.668
Column1			
MW-15S	TCE	5.1	1.629
MW-15S	TCE	3.3	1.194
MW-15S	TCE	4.1	1.411
Shapiro-Wilk W Statistic			
0.89473733			
p-value			
0.00245755			
Count			
36			
MW-15S	TCE	5.2	1.649
MW-15S	TCE	5	1.609
MW-15S	TCE	3.1	1.131
MW-15S	TCE	3.4	1.224
Column1			
MW-15S	TCE	3.9	3.219
MW-15S	TCE	7	1.946
MW-15S	TCE	4.2	1.435
Shapiro-Wilk W Statistic			
0.69213147			
p-value			
1.6205E-07			
Count			
37			
MW-15S	TCE	3.9	1.361
MW-15S	TCE	6.7	1.902
MW-15S	TCR	0.0081	-4.816
MW-15S	TCR	0.01	-4.605
MW-15S	TCR	0.01	-4.605

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Well	d	Value	Ln_value	
MW-15S	TCR	0.01	-4.605	
MW-15S	TCR	0.01	-4.605	
MW-15S	TCR	0.01	-4.605	
MW-15S	TCR	0.01	-4.605	
MW-15S	TCR	0.01	-4.605	
MW-15S	TCR	0.01	-4.605	
MW-15S	TCR	0.01	-4.605	
MW-15S	TCR	0.01	-4.605	
MW-15S	TCR	0.01	-4.605	
MW-15S	TCR	0.01	-4.605	
MW-15S	TCR	0.013	-4.343	
MW-15S	TCR	0.014	-4.269	
MW-15S	TCR	0.02	-3.912	
MW-15S	TCR	0.04	-3.219	
MW-15S	TCR	0.044	-3.124	
MW-15S	TCR	0.01	-4.605	
MW-15S	TCR	0.01	-4.605	
MW-15S	TCR	0.01	-4.605	
MW-15S	TCR	0.012	-4.423	
MW-15S	TCR	0.015	-4.200	
MW-15S	TCR	0.014	-4.269	
MW-15S	TCR	0.01	-4.605	
MW-15S	TCR	0.01	-4.605	
MW-15S	TCR	0.01	-4.605	Column1
MW-15S	TCR	0.01	-4.605	Shapiro-Wilk W Statistic 0.38153475
MW-15S	TCR	0.01	-4.605	p-value 2.5169E-11
MW-15S	TCR	0.021	-3.863	Count 37
MW-15S	TCR	0.01	-4.605	
MW-15S	TCR	0.014	-4.269	Column1
MW-15S	TCR	0.017	3.219	Shapiro-Wilk W Statistic 0.51181711
MW-15S	TCR	0.01	-4.605	p-value 6.2198E-10
MW-15S	TCR	0.013	-4.343	Count 37
MW-15S	TCR	0.01	-4.605	
MW-15S	TCR	0.015	-4.200	
MW-15S	TOL	0.5	-0.693	
MW-15S	TOL	0.5	-0.693	
MW-15S	TOL	0.5	-0.693	
MW-15S	TOL	1	0.000	
MW-15S	TOL	1	0.000	
MW-15S	TOL	1	0.000	
MW-15S	TOL	1	0.000	
MW-15S	TOL	1	0.000	
MW-15S	TOL	1	0.000	
MW-15S	TOL	1	0.000	
MW-15S	TOL	1	0.000	
MW-15S	TOL	1	0.000	
MW-15S	TOL	1	0.000	
MW-15S	TOL	1.2	0.182	
MW-15S	TOL	4	1.386	
MW-15S	TOL	14	2.639	
MW-15S	TOL	4	1.386	
MW-15S	TOL	60	4.094	
MW-15S	TOL	2.5	0.916	
MW-15S	TOL	1	0.000	
MW-15S	TOL	1.8	0.588	
MW-15S	TOL	13	2.565	
MW-15S	TOL	1	0.000	
MW-15S	TOL	1	0.000	
MW-15S	TOL	5.5	1.705	Column1

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Well	d	Value	Ln value		
MW-15S	TOL	9.3	2.230	Shapiro-Wilk W Statistic	0.95691953
MW-15S	TOL	1	0.000	p-value	0.60641981
MW-15S	TOL	1	0.000	Count	16
MW-15S	TOL	1	0.000		
MW-15S	TOL	1	0.000		
MW-15S	TOL	1	0.000	Column1	
MW-15S	TOL	1	3.219	Shapiro-Wilk W Statistic	0.329596
MW-15S	TOL	2	0.693	p-value	1.1631E-11
MW-15S	TOL	1	0.000	Count	36
MW-15S	TOL	1	0.000		
MW-15S	TOL	2	0.693		
MW-15S	TX	0.5	-0.693		
MW-15S	TX	0.5	-0.693		
MW-15S	TX	0.5	-0.693		
MW-15S	TX	1	0.000		
MW-15S	TX	1	0.000		
MW-15S	TX	1	0.000		
MW-15S	TX	1	0.000		
MW-15S	TX	1	0.000		
MW-15S	TX	1	0.000		
MW-15S	TX	1	0.000		
MW-15S	TX	1	0.000		
MW-15S	TX	1	0.000		
MW-15S	TX	1	0.000		
MW-15S	TX	1	0.000		
MW-15S	TX	1	0.000		
MW-15S	TX	2.4	0.876		
MW-15S	TX	4	1.386		
MW-15S	TX	22	3.091		
MW-15S	TX	27	3.296		
MW-15S	TX	130	4.868		
MW-15S	TX	12	2.485		
MW-15S	TX	1	0.000		
MW-15S	TX	22	3.091		
MW-15S	TX	45	3.807		
MW-15S	TX	5.4	1.686		
MW-15S	TX	2.6	0.956		
MW-15S	TX	1	0.000	Column1	
MW-15S	TX	8.5	2.140	Shapiro-Wilk W Statistic	0.96287504
MW-15S	TX	1.3	0.262	p-value	0.49885052
MW-15S	TX	1.7	0.531	Count	24
MW-15S	TX	3.7	1.308		
MW-15S	TX	7.2	1.974		
MW-15S	TX	2.9	1.065	Column1	
MW-15S	TX	12	3.219	Shapiro-Wilk W Statistic	0.42227669
MW-15S	TX	2.2	0.788	p-value	6.4988E-11
MW-15S	TX	2.2	0.788	Count	37
MW-15S	TX	23	3.135		
MW-15S	TX	4	1.386		
MW-16	BEN	0.5	-0.693		
MW-16	BEN	0.5	-0.693		
MW-16	BEN	0.5	-0.693		
MW-16	BEN	0.5	-0.690		
MW-16	BEN	1.2	0.182		
MW-16	BEN	5	1.609		
MW-16	BEN	10	2.303		
MW-16	BEN	10	2.303		
MW-16	BEN	25	3.219		
MW-16	BEN	25	3.219		
MW-16	BEN	50	3.912		

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Well	d	Value	Ln_value		
MW-16	BEN	0.5	-0.693		
MW-16	BEN	5	1.609		
MW-16	BEN	10	2.303		
MW-16	BEN	0.5	-0.693		
MW-16	BEN	0.5	-0.693		
MW-16	BEN	0.5	-0.693		
MW-16	BEN	0.5	-0.693		
MW-16	BEN	0.5	-0.693		
MW-16	BEN	1	0.000	Column1	
MW-16	BEN	1	0.000	Shapiro-Wilk W Statistic	0.81722979
MW-16	BEN	1.2	0.182	p-value	0.00021821
MW-16	BEN	2.5	0.916	Count	28
MW-16	BEN	0.5	-0.693		
MW-16	BEN	0.5	-0.693	Column1	
MW-16	BEN	0.5	-0.693	Shapiro-Wilk W Statistic	0.52602707
MW-16	BEN	2.5	3.219	p-value	7.1154E-09
MW-16	BEN	1	0.000	Count	31
MW-16	BEN	2	0.693		
MW-16	BEN	2	0.693		
MW-16	BEN	5	1.609		
MW-16	CD	0.005	-5.298		
MW-16	CD	0.005	-5.298		
MW-16	CD	0.005	-5.298		
MW-16	CD	0.005	-5.298		
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MW-16	CD	0.005	-5.298		
MW-16	CD	0.005	-5.298		
MW-16	CD	0.02	-3.912		
MW-16	CD	0.005	-5.298		
MW-16	CD	0.005	-5.298		
MW-16	CD	0.005	-5.298		
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MW-16	CD	0.005	-5.298		
MW-16	CD	0.005	-5.298		
MW-16	CD	0.005	-5.298	Column1	
MW-16	CD	0.005	-5.298	Shapiro-Wilk W Statistic	0.21627562
MW-16	CD	0.005	-5.298	p-value	9.5612E-12
MW-16	CD	0.005	-5.298	Count	31
MW-16	CD	0.005	-5.298		
MW-16	CD	0.005	-5.298	Column1	
MW-16	CD	0.005	3.219	Shapiro-Wilk W Statistic	0.17561244
MW-16	CD	0.005	-5.298	p-value	4.6359E-12
MW-16	CD	0.005	-5.298	Count	31
MW-16	CD	0.005	-5.298		
MW-16	CD	0.005	-5.298		
MW-16	CU	0.01	-4.605		
MW-16	CU	0.02	-3.912		
MW-16	CU	0.02	-3.912		
MW-16	CU	0.02	-3.912		
MW-16	CU	0.02	-3.912		
MW-16	CU	0.02	-3.912		
MW-16	CU	0.02	-3.910		

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Well	d	Value	Ln_value		
MW-16	HCR	0.02	-3.912		
MW-16	HCR	0.02	-3.912		
MW-16	HCR	0.02	-3.912		
MW-16	HCR	0.02	-3.912		
MW-16	HCR	0.02	-3.910		
MW-16	HCR	0.04	-3.219		
MW-16	HCR	0.02	-3.912		
MW-16	HCR	0.02	-3.912		
MW-16	HCR	0.02	-3.912		
MW-16	HCR	0.02	-3.912		
MW-16	HCR	0.02	-3.912		
MW-16	HCR	0.01	-4.605		
MW-16	HCR	0.01	-4.605		
MW-16	HCR	0.02	-3.912		Column1
MW-16	HCR	0.02	-3.912	Shapiro-Wilk W Statistic	0.29948288
MW-16	HCR	0.02	-3.912	p-value	4.5855E-11
MW-16	HCR	0.02	-3.912	Count	31
MW-16	HCR	0.02	-3.912		
MW-16	HCR	0.02	-3.912		Column1
MW-16	HCR	0.02	3.219	Shapiro-Wilk W Statistic	0.50873978
MW-16	HCR	0.02	-3.912	p-value	4.6012E-09
MW-16	HCR	0.01	-4.605	Count	31
MW-16	HCR	0.02	-3.912		
MW-16	HCR	0.01	-4.605		
MW-16	TCE	15	2.708		
MW-16	TCE	22	3.091		
MW-16	TCE	24	3.178		
MW-16	TCE	35	3.555		
MW-16	TCE	37	3.611		
MW-16	TCE	42	3.738		
MW-16	TCE	51	3.932		
MW-16	TCE	52	3.951		
MW-16	TCE	72	4.277		
MW-16	TCE	76	4.331		
MW-16	TCE	91	4.510		
MW-16	TCE	17	2.833		
MW-16	TCE	34	3.526		
MW-16	TCE	67	4.205		
MW-16	TCE	60	4.094		
MW-16	TCE	26	3.258		
MW-16	TCE	36	3.584		
MW-16	TCE	110	4.700		
MW-16	TCE	73	4.290		
MW-16	TCE	32	3.466		
MW-16	TCE	31	3.434		
MW-16	TCE	30	3.401		Column1
MW-16	TCE	53	3.970	Shapiro-Wilk W Statistic	0.97462065
MW-16	TCE	29	3.367	p-value	0.65334386
MW-16	TCE	29	3.367	Count	31
MW-16	TCE	28	3.332		
MW-16	TCE	58	3.219		Column1
MW-16	TCE	36	3.584	Shapiro-Wilk W Statistic	0.89390917
MW-16	TCE	39	3.664	p-value	0.0050963
MW-16	TCE	29	3.367	Count	31
MW-16	TCE	42	3.738		
MW-16	TCR	0.01	-4.605		
MW-16	TCR	0.01	-4.605		

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	Column1	Column2
Shapiro-Wilk W Statistic	0.75672796	0.76638723
p-value	3.7752E-07	0.00038634
Count	44	19

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Well	d	Value	Ln value			
MW-1S	HCR	0.02	-3.912			
MW-1S	HCR	0.01	-4.605			
MW-1S	HCR	0.01	-4.605			
MW-1S	HCR	0.02	-3.912			
MW-1S	HCR	0.02	-3.912			
MW-1S	HCR	0.02	-3.912			
MW-1S	HCR	0.02	-3.912			
MW-1S	HCR	0.02	-3.912			
MW-1S	HCR	0.02	-3.912			
MW-1S	HCR	0.02	-3.912			
MW-1S	HCR	0.02	3.219	Shapiro-Wilk W Statistic	Column1	Column2
MW-1S	HCR	0.02	-3.912	p-value	0.43355115	0.35051223
MW-1S	HCR	0.025	-3.689	Count	8.1666E-12	1.0698E-12
MW-1S	HCR	0.02	-3.912		44	44
MW-1S	HCR	0.01	-4.605			
MW-1S	TCE	5.7	1.741			
MW-1S	TCE	7.9	2.067			
MW-1S	TCE	9.2	2.219			
MW-1S	TCE	9.3	2.230			
MW-1S	TCE	9.9	2.293			
MW-1S	TCE	10	2.303			
MW-1S	TCE	11	2.398			
MW-1S	TCE	11	2.398			
MW-1S	TCE	12	2.485			
MW-1S	TCE	13	2.560			
MW-1S	TCE	13	2.565			
MW-1S	TCE	13	2.565			
MW-1S	TCE	14	2.639			
MW-1S	TCE	14	2.639			
MW-1S	TCE	14	2.639			
MW-1S	TCE	16	2.773			
MW-1S	TCE	17	2.833			
MW-1S	TCE	18	2.890			
MW-1S	TCE	18	2.890			
MW-1S	TCE	19	2.944			
MW-1S	TCE	20	2.996			
MW-1S	TCE	22	3.091			
MW-1S	TCE	23	3.136			
MW-1S	TCE	26	3.258			
MW-1S	TCE	5.2	1.649			
MW-1S	TCE	4.4	1.482			
MW-1S	TCE	6.2	1.825			
MW-1S	TCE	15	2.708			
MW-1S	TCE	8.4	2.128			
MW-1S	TCE	2.9	1.065			
MW-1S	TCE	9.7	2.272			
MW-1S	TCE	16	2.773			
MW-1S	TCE	6	1.792			
MW-1S	TCE	15	2.708			
MW-1S	TCE	14	2.639			
MW-1S	TCE	12	2.485			
MW-1S	TCE	12	2.485			
MW-1S	TCE	14	2.639			
MW-1S	TCE	14	2.639			
MW-1S	TCE	7.8	3.219	Shapiro-Wilk W Statistic	Column1	Column2
MW-1S	TCE	10	2.303	p-value	0.97667259	0.965646
MW-1S	TCE	7.2	1.974	Count	0.5062334	0.21079855
MW-1S	TCE	9.1	2.208		44	44
MW-1S	TCE	9.1	2.208			

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	Column1	Column2
Shapiro-Wilk W Statistic	0.27142747	0.32757004
p-value	1.8208E-13	6.3042E-13
Count	44	44

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Well	d	Value	Ln_value
MW-1S	TOL	1	0.000
MW-1S	TOL	1	0.000
MW-1S	TOL	1	0.000
MW-1S	TOL	1	0.000
MW-1S	TOL	1.5	0.406
MW-1S	TOL	1.7	0.531
MW-1S	TOL	2.2	0.789
MW-1S	TOL	2.5	0.916
MW-1S	TOL	1	0.000
MW-1S	TOL	1	0.000
MW-1S	TOL	1.2	0.182
MW-1S	TOL	1	0.000
MW-1S	TOL	1	0.000
MW-1S	TOL	1	0.000
MW-1S	TOL	1	0.000
MW-1S	TOL	1	0.000
MW-1S	TOL	1	0.000
MW-1S	TOL	1	0.000
MW-1S	TOL	1	0.000
MW-1S	TOL	1	0.000
MW-1S	TOL	1	0.000
MW-1S	TOL	1	0.000
MW-1S	TOL	1	0.000
MW-1S	TOL	1	3.219
MW-1S	TOL	2	0.693
MW-1S	TOL	1	0.000
MW-1S	TOL	1	0.000
MW-1S	TOL	1	0.000
MW-1S	TOL	1	0.000
MW-1S	TX	0.01	-4.605
MW-1S	TX	0.5	-0.693
MW-1S	TX	1	0.000
MW-1S	TX	1	0.000
MW-1S	TX	1	0.000
MW-1S	TX	1	0.000
MW-1S	TX	1	0.000
MW-1S	TX	1	0.000
MW-1S	TX	1	0.000
MW-1S	TX	1	0.000
MW-1S	TX	1	0.000
MW-1S	TX	1	0.000
MW-1S	TX	1	0.000
MW-1S	TX	1	0.000
MW-1S	TX	1	0.000
MW-1S	TX	1	0.000
MW-1S	TX	1	0.000
MW-1S	TX	1	0.000
MW-1S	TX	1	0.000
MW-1S	TX	1	0.000
MW-1S	TX	1	0.000
MW-1S	TX	3	1.099
MW-1S	TX	4	1.386
MW-1S	TX	4.3	1.459
MW-1S	TX	4.3	1.459
MW-1S	TX	5	1.609
MW-1S	TX	5.6	1.723
MW-1S	TX	5.8	1.750
MW-1S	TX	1	0.000
MW-1S	TX	1	0.000
MW-1S	TX	6.1	1.808
MW-1S	TX	3.9	1.361
MW-1S	TX	5.1	1.629
MW-1S	TX	4.9	1.589
MW-1S	TX	3.7	1.308

	Column1	Column2
Shapiro-Wilk W Statistic	0.67910005	0.8438498
p-value	1.5757E-08	0.03084836
Count	44	12

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Well	d	Value	Ln value
MW-1S	TX	2.8	1.030
MW-1S	TX	2	0.693
MW-1S	TX	1.2	0.182
MW-1S	TX	1	0.000
MW-1S	TX	1	0.000
MW-1S	TX	1	0.000
MW-1S	TX	1	0.000
MW-1S	TX	1	0.000
MW-1S	TX	1	3.219
MW-1S	TX	2	0.693
MW-1S	TX	2	0.693
MW-1S	TX	1	0.000
MW-1S	TX	2	0.693
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.52	-0.654
MW-3	BEN	1	0.000
MW-3	BEN	1.2	0.180
MW-3	BEN	2.5	0.916
MW-3	BEN	5	1.609
MW-3	BEN	5	1.609
MW-3	BEN	7	1.946
MW-3	BEN	7.4	2.002
MW-3	BEN	9	2.197
MW-3	BEN	50	3.912
MW-3	BEN	50	3.912
MW-3	BEN	50	3.912
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.57	-0.562
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.5	-0.693
MW-3	BEN	0.5	3.219
MW-3	BEN	0.5	-0.693
MW-3	BEN	1	0.000
MW-3	BEN	1	0.000
MW-3	BEN	5	1.609
MW-3	CD	0.0027	-5.915
MW-3	CD	0.003	-5.809

	Column1	Column2
Shapiro-Wilk W Statistic	0.75611024	0.69135741
p-value	3.6725E-07	2.1527E-05
Count	44	21

	Column1	Column2
Shapiro-Wilk W Statistic	0.37038795	0.62812067
p-value	1.71E-12	5.8214E-09
Count	44	41

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	Column1	Column2
Shapiro-Wilk W Statistic	0.35937011	0.32907943
p-value	1.3169E-12	6.5248E-13
Count	44	44

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Well	d	Value	Ln_value
MW-3	TCE	16	2.773
MW-3	TCE	17	2.833
MW-3	TCE	25	3.219
MW-3	TCE	26	3.258
MW-3	TCE	27	3.296
MW-3	TCE	28	3.332
MW-3	TCE	38	3.638
MW-3	TCE	65	4.174
MW-3	TCE	71	4.263
MW-3	TCE	74	4.304
MW-3	TCE	74	4.304
MW-3	TCE	76	4.330
MW-3	TCE	76	4.331
MW-3	TCE	76	4.331
MW-3	TCE	84	4.431
MW-3	TCE	100	4.605
MW-3	TCE	110	4.701
MW-3	TCE	120	4.788
MW-3	TCE	130	4.868
MW-3	TCE	130	4.868
MW-3	TCE	130	4.868
MW-3	TCE	72	4.277
MW-3	TCE	57	4.043
MW-3	TCE	9.5	2.251
MW-3	TCE	30	3.401
MW-3	TCE	26	3.258
MW-3	TCE	46	3.829
MW-3	TCE	17	2.833
MW-3	TCE	21	3.045
MW-3	TCE	28	3.332
MW-3	TCE	13	2.565
MW-3	TCE	13	2.565
MW-3	TCE	24	3.178
MW-3	TCE	25	3.219
MW-3	TCE	18	2.890
MW-3	TCE	25	3.219
MW-3	TCE	24	3.219
MW-3	TCE	26	3.258
MW-3	TCE	21	3.045
MW-3	TCE	43	3.761
MW-3	TCE	170	5.136
MW-3	TCR	0.0081	-4.816
MW-3	TCR	0.01	-4.605
MW-3	TCR	0.01	-4.605
MW-3	TCR	0.01	-4.605
MW-3	TCR	0.01	-4.605
MW-3	TCR	0.01	-4.605
MW-3	TCR	0.01	-4.605
MW-3	TCR	0.01	-4.605
MW-3	TCR	0.01	-4.605
MW-3	TCR	0.01	-4.605
MW-3	TCR	0.01	-4.605
MW-3	TCR	0.01	-4.605
MW-3	TCR	0.01	-4.605
MW-3	TCR	0.01	-4.605
MW-3	TCR	0.01	-4.605
MW-3	TCR	0.01	-4.605
MW-3	TCR	0.01	-2.300
MW-3	TCR	0.014	-4.269

	Column1	Column2
Shapiro-Wilk W Statistic	0.84257594	0.94524957
p-value	2.8432E-05	0.0367198
Count	44	44

Well	d	Value	Ln_value			
MW-3	TCR	0.02	-3.912			
MW-3	TCR	0.02	-3.912			
MW-3	TCR	0.02	-3.912			
MW-3	TCR	0.02	-3.912			
MW-3	TCR	0.06	-2.813			
MW-3	TCR	0.07	-2.659			
MW-3	TCR	0.01	-4.605			
MW-3	TCR	0.01	-4.605			
MW-3	TCR	0.01	-4.605			
MW-3	TCR	0.01	-4.605			
MW-3	TCR	0.01	-4.605			
MW-3	TCR	0.01	-4.605			
MW-3	TCR	0.01	-4.605			
MW-3	TCR	0.01	-4.605			
MW-3	TCR	0.01	-4.605			
MW-3	TCR	0.01	-4.605			
MW-3	TCR	0.01	-4.605			
MW-3	TCR	0.01	-4.605			
MW-3	TCR	0.01	-4.605			
MW-3	TCR	0.01	-4.605			
MW-3	TCR	0.01	3.219		Column1	Column2
MW-3	TCR	0.01	-4.605	Shapiro-Wilk W Statistic	0.34057377	0.34994424
MW-3	TCR	0.01	-4.605	p-value	8.4942E-13	1.0558E-12
MW-3	TCR	0.01	-4.605	Count	44	44
MW-3	TCR	0.01	-4.605			
MW-3	TOL	1	0.000			
MW-3	TOL	1	0.000			
MW-3	TOL	1	0.000			
MW-3	TOL	1	0.000			
MW-3	TOL	1	0.000			
MW-3	TOL	1	0.000			
MW-3	TOL	1	0.000			
MW-3	TOL	1	0.000			
MW-3	TOL	1	0.000			
MW-3	TOL	1	0.000			
MW-3	TOL	1	0.000			
MW-3	TOL	1	0.000			
MW-3	TOL	1	0.000			
MW-3	TOL	2	0.693			
MW-3	TOL	3.3	1.194			
MW-3	TOL	5	1.609			
MW-3	TOL	5	1.609			
MW-3	TOL	5	1.609			
MW-3	TOL	10	2.303			
MW-3	TOL	17	2.833			
MW-3	TOL	50	3.912			
MW-3	TOL	50	3.912			
MW-3	TOL	100	4.605			
MW-3	TOL	1	0.000			
MW-3	TOL	1	0.000			
MW-3	TOL	2	0.693			
MW-3	TOL	1	0.000			
MW-3	TOL	1	0.000			
MW-3	TOL	1	0.000			
MW-3	TOL	1.8	0.588			
MW-3	TOL	1	0.000			
MW-3	TOL	2.6	0.956			
MW-3	TOL	4.3	1.459			

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Well	d	Value	Ln value			
MW-3	TOL	1	0.000			
MW-3	TOL	1	0.000			
MW-3	TOL	1	0.000			
MW-3	TOL	1	0.000			
MW-3	TOL	1	0.000	Shapiro-Wilk W Statistic	Column1	Column2
MW-3	TOL	1	3.219	p-value	0.36083567	0.93727846
MW-3	TOL	2	0.693	Count	1.3632E-12	0.26017572
MW-3	TOL	1	0.000		44	18
MW-3	TOL	1	0.000			
MW-3	TOL	5	1.609			
MW-3	TX	0.5	-0.693			
MW-3	TX	1	0.000			
MW-3	TX	1	0.000			
MW-3	TX	1	0.000			
MW-3	TX	1	0.000			
MW-3	TX	1	0.000			
MW-3	TX	1	0.000			
MW-3	TX	1	0.000			
MW-3	TX	1	0.000			
MW-3	TX	1	0.000			
MW-3	TX	1	0.000			
MW-3	TX	4	1.386			
MW-3	TX	4.8	1.569			
MW-3	TX	5	1.609			
MW-3	TX	5.9	1.775			
MW-3	TX	10	2.303			
MW-3	TX	10	2.303			
MW-3	TX	10	2.303			
MW-3	TX	12	2.480			
MW-3	TX	60	4.094			
MW-3	TX	150	5.011			
MW-3	TX	720	6.579			
MW-3	TX	1500	7.313			
MW-3	TX	1	0.000			
MW-3	TX	1	0.000			
MW-3	TX	8.8	2.175			
MW-3	TX	3.3	1.194			
MW-3	TX	5.2	1.649			
MW-3	TX	3.6	1.281			
MW-3	TX	12	2.485			
MW-3	TX	6.2	1.825			
MW-3	TX	4.2	1.435			
MW-3	TX	3	1.099			
MW-3	TX	3.7	1.308			
MW-3	TX	1.2	0.182			
MW-3	TX	1	0.000			
MW-3	TX	1	0.000			
MW-3	TX	1	0.000			
MW-3	TX	1	3.219			
MW-3	TX	2	0.693	Shapiro-Wilk W Statistic	Column1	Column2
MW-3	TX	2	0.693	p-value	0.2462337	0.85035651
MW-3	TX	1	0.000	Count	1.0663E-13	0.00117066
MW-3	TX	10	2.303		44	27
MW-4	BEN	0.5	-0.693			
MW-4	BEN	0.5	-0.693			
MW-4	BEN	0.5	-0.693			
MW-4	BEN	0.5	-0.693			
MW-4	BEN	0.5	-0.693			

Well	d	Value	Ln value
MW-4	BEN	0.5	-0.693
MW-4	BEN	0.5	-0.693
MW-4	BEN	0.5	-0.693
MW-4	BEN	0.5	-0.693
MW-4	BEN	0.58	-0.545
MW-4	BEN	0.6	-0.511
MW-4	BEN	0.81	-0.211
MW-4	BEN	1.3	0.262
MW-4	BEN	5	1.600
MW-4	BEN	5	1.609
MW-4	BEN	5	1.609
MW-4	BEN	6.7	1.902
MW-4	BEN	10	2.303
MW-4	BEN	12	2.485
MW-4	BEN	14	2.639
MW-4	BEN	50	3.912
MW-4	BEN	71	4.263
MW-4	BEN	130	4.868
MW-4	BEN	250	5.522
MW-4	BEN	5	1.609
MW-4	BEN	100	4.605
MW-4	BEN	10	2.303
MW-4	BEN	2.5	0.916
MW-4	BEN	50	3.912
MW-4	BEN	25	3.219
MW-4	BEN	50	3.912
MW-4	BEN	0.5	-0.693
MW-4	BEN	6.2	1.825
MW-4	BEN	12	2.485
MW-4	BEN	5	1.609
MW-4	BEN	5	1.609
MW-4	BEN	5	1.609
MW-4	BEN	2.9	1.065
MW-4	BEN	12	2.485
MW-4	BEN	6.2	3.219
MW-4	BEN	5	1.609
MW-4	BEN	3.5	1.253
MW-4	BEN	10	2.303
MW-4	BEN	5	1.609
MW-4	CD	0.005	-5.298
MW-4	CD	0.028	-3.576
MW-4	CD	0.05	-2.996
MW-4	CD	0.07	-2.659
MW-4	CD	0.076	-2.577
MW-4	CD	0.08	-2.526
MW-4	CD	0.12	-2.120
MW-4	CD	0.13	-2.040
MW-4	CD	0.2	-1.609
MW-4	CD	0.2	-1.609
MW-4	CD	0.21	-1.561
MW-4	CD	0.23	-1.470
MW-4	CD	0.23	-1.470
MW-4	CD	0.26	-1.347
MW-4	CD	0.28	-1.273
MW-4	CD	0.32	-1.139
MW-4	CD	0.33	-1.109
MW-4	CD	0.35	-1.050
MW-4	CD	0.45	-0.790
MW-4	CD	0.47	-0.755

	Column1	Column2
Shapiro-Wilk W Statistic	0.47721015	0.91818497
p-value	2.5882E-11	0.00414237
Count	44	44

	Column1	Column2
Shapiro-Wilk W Statistic	0.96815953	0.85364227
p-value	0.26016375	5.4153E-05
Count	44	44

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Well	d	Value	Ln value			
MW-4	CU	0.08	-2.526			
MW-4	CU	0.02	-3.912			
MW-4	CU	0.02	-3.912			
MW-4	CU	0.02	-3.912			
MW-4	CU	0.03	3.219		Column1	Column2
MW-4	CU	0.02	-3.912	Shapiro-Wilk W Statistic	0.51756197	0.49899087
MW-4	CU	0.025	-3.689	p-value	7.9876E-11	4.7186E-11
MW-4	CU	0.025	-3.689	Count	44	44
MW-4	CU	0.075	-2.590			
MW-4	EBN	1	0.000			
MW-4	EBN	1	0.000			
MW-4	EBN	1	0.000			
MW-4	EBN	1	0.000			
MW-4	EBN	1.8	0.588			
MW-4	EBN	7	1.946			
MW-4	EBN	8.3	2.116			
MW-4	EBN	10	2.303			
MW-4	EBN	12	2.485			
MW-4	EBN	15	2.708			
MW-4	EBN	15	2.708			
MW-4	EBN	88	4.477			
MW-4	EBN	140	4.942			
MW-4	EBN	200	5.298			
MW-4	EBN	230	5.438			
MW-4	EBN	270	5.590			
MW-4	EBN	730	6.593			
MW-4	EBN	960	6.867			
MW-4	EBN	1300	7.170			
MW-4	EBN	1600	7.378			
MW-4	EBN	4100	8.319			
MW-4	EBN	6700	8.810			
MW-4	EBN	10000	9.210			
MW-4	EBN	10000	9.210			
MW-4	EBN	350	5.858			
MW-4	EBN	1700	7.438			
MW-4	EBN	320	5.768			
MW-4	EBN	75	4.317			
MW-4	EBN	2100	7.650			
MW-4	EBN	1300	7.170			
MW-4	EBN	1000	6.908			
MW-4	EBN	1100	7.003			
MW-4	EBN	1100	7.003			
MW-4	EBN	1300	7.170			
MW-4	EBN	810	6.697			
MW-4	EBN	460	6.131			
MW-4	EBN	530	6.273			
MW-4	EBN	320	5.768			
MW-4	EBN	1200	7.090		Column1	Column2
MW-4	EBN	740	3.219	Shapiro-Wilk W Statistic	0.52591692	0.94495125
MW-4	EBN	520	6.254	p-value	1.0168E-10	0.05090634
MW-4	EBN	220	5.394	Count	44	40
MW-4	EBN	670	6.507			
MW-4	EBN	92	4.522			
MW-4	HCR	0.36	-1.022			
MW-4	HCR	1.8	0.588			
MW-4	HCR	16.4	2.797			
MW-4	HCR	21	3.045			
MW-4	HCR	21.6	3.073			
MW-4	HCR	23.8	3.170			

Well	d	Value	Ln value
MW-4	HCR	26.9	3.292
MW-4	HCR	32.2	3.472
MW-4	HCR	33	3.497
MW-4	HCR	35.5	3.570
MW-4	HCR	39.1	3.666
MW-4	HCR	41	3.714
MW-4	HCR	42	3.738
MW-4	HCR	43	3.761
MW-4	HCR	49.4	3.900
MW-4	HCR	58.9	4.076
MW-4	HCR	59	4.078
MW-4	HCR	60.7	4.100
MW-4	HCR	79.9	4.381
MW-4	HCR	81.7	4.403
MW-4	HCR	100	4.605
MW-4	HCR	109	4.691
MW-4	HCR	110	4.701
MW-4	HCR	120	4.788
MW-4	HCR	28.8	3.360
MW-4	HCR	8.6	2.152
MW-4	HCR	24.45	3.197
MW-4	HCR	30.8	3.428
MW-4	HCR	25.7	3.246
MW-4	HCR	28.4	3.346
MW-4	HCR	50	3.912
MW-4	HCR	63.8	4.156
MW-4	HCR	45.9	3.826
MW-4	HCR	27.3	3.307
MW-4	HCR	36	3.584
MW-4	HCR	73.8	4.301
MW-4	HCR	39.2	3.669
MW-4	HCR	7.2	1.974
MW-4	HCR	16.3	2.791
MW-4	HCR	34.1	3.219
MW-4	HCR	78.6	4.364
MW-4	HCR	0.57	-0.562
MW-4	HCR	41.1	3.716
MW-4	HCR	58.2	4.064
MW-4	TCE	25	3.219
MW-4	TCE	100	4.605
MW-4	TCE	120	4.788
MW-4	TCE	130	4.868
MW-4	TCE	170	5.136
MW-4	TCE	180	5.193
MW-4	TCE	190	5.247
MW-4	TCE	190	5.247
MW-4	TCE	220	5.394
MW-4	TCE	230	5.438
MW-4	TCE	250	5.522
MW-4	TCE	250	5.522
MW-4	TCE	250	5.522
MW-4	TCE	250	5.522
MW-4	TCE	280	5.635
MW-4	TCE	280	5.635
MW-4	TCE	280	5.635
MW-4	TCE	280	5.635
MW-4	TCE	290	5.670
MW-4	TCE	290	5.670
MW-4	TCE	320	5.768

	Column1	Column2
Shapiro-Wilk W Statistic	0.92853067	0.76453612
p-value	0.00928372	5.3693E-07
Count	44	44

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Well	d	Value	Ln_value		
MW-4	TCE	340	5.829		
MW-4	TCE	390	5.960		
MW-4	TCE	400	5.992		
MW-4	TCE	190	5.247		
MW-4	TCE	67	4.205		
MW-4	TCE	90	4.500		
MW-4	TCE	150	5.011		
MW-4	TCE	160	5.075		
MW-4	TCE	130	4.868		
MW-4	TCE	140	4.942		
MW-4	TCE	310	5.737		
MW-4	TCE	330	5.799		
MW-4	TCE	150	5.011		
MW-4	TCE	150	5.011		
MW-4	TCE	230	5.438		
MW-4	TCE	180	5.193		
MW-4	TCE	92	4.522		
MW-4	TCE	120	4.787	Shapiro-Wilk W Statistic	0.9830321 0.85953209
MW-4	TCE	120	3.219	p-value	0.75468985 7.7086E-05
MW-4	TCE	260	5.561	Count	44 44
MW-4	TCE	190	5.247		
MW-4	TCE	140	4.942		
MW-4	TCE	210	5.347		
MW-4	TCR	2.2	0.789		
MW-4	TCR	18.4	2.912		
MW-4	TCR	23.2	3.144		
MW-4	TCR	26.4	3.273		
MW-4	TCR	27.1	3.300		
MW-4	TCR	27.4	3.311		
MW-4	TCR	29.2	3.374		
MW-4	TCR	34	3.526		
MW-4	TCR	36	3.584		
MW-4	TCR	40.8	3.709		
MW-4	TCR	41.4	3.723		
MW-4	TCR	48.4	3.880		
MW-4	TCR	52.8	3.960		
MW-4	TCR	59.7	4.089		
MW-4	TCR	65.3	4.179		
MW-4	TCR	78.5	4.363		
MW-4	TCR	80.3	4.386		
MW-4	TCR	80.7	4.391		
MW-4	TCR	95.1	4.555		
MW-4	TCR	98	4.585		
MW-4	TCR	100	4.605		
MW-4	TCR	101	4.615		
MW-4	TCR	120	4.788		
MW-4	TCR	400	5.992		
MW-4	TCR	34.3	3.535		
MW-4	TCR	9.1	2.208		
MW-4	TCR	29.6	3.388		
MW-4	TCR	28.9	3.364		
MW-4	TCR	32.4	3.478		
MW-4	TCR	38	3.638		
MW-4	TCR	58.9	4.076		
MW-4	TCR	75.7	4.327		
MW-4	TCR	34.5	3.541		
MW-4	TCR	18.8	2.934		
MW-4	TCR	35.2	3.561		
MW-4	TCR	85.3	4.446	Shapiro-Wilk W Statistic	0.57304884 0.93241741

S-WSCC

Well#	d	Value	Ln value			
MW-4	TCR	44	3.784	p-value	4.2006E-10	0.012684
MW-4	TCR	14.1	2.646	Count	44	44
MW-4	TCR	18.9	2.939			
MW-4	TCR	36.2	3.219			
MW-4	TCR	85.2	4.445			
MW-4	TCR	42.8	3.757			
MW-4	TCR	49.7	3.906			
MW-4	TCR	105	4.654			
MW-4	TOL	1	0.000			
MW-4	TOL	1	0.000			
MW-4	TOL	1	0.000			
MW-4	TOL	1	0.000			
MW-4	TOL	1	0.000			
MW-4	TOL	1	0.000			
MW-4	TOL	1	0.000			
MW-4	TOL	1	0.000			
MW-4	TOL	2	0.693			
MW-4	TOL	7.2	1.974			
MW-4	TOL	10	2.303			
MW-4	TOL	10	2.303			
MW-4	TOL	10	2.303			
MW-4	TOL	10	2.303			
MW-4	TOL	12	2.485			
MW-4	TOL	17	2.833			
MW-4	TOL	20	2.996			
MW-4	TOL	23	3.136			
MW-4	TOL	50	3.912			
MW-4	TOL	6900	8.839			
MW-4	TOL	10000	9.210			
MW-4	TOL	16000	9.680			
MW-4	TOL	18000	9.798			
MW-4	TOL	10	2.303			
MW-4	TOL	1600	7.378			
MW-4	TOL	340	5.829			
MW-4	TOL	5	1.609			
MW-4	TOL	100	4.605			
MW-4	TOL	680	6.522			
MW-4	TOL	100	4.605			
MW-4	TOL	380	5.940			
MW-4	TOL	12	2.485			
MW-4	TOL	35	3.555			
MW-4	TOL	10	2.303			
MW-4	TOL	10	2.303			
MW-4	TOL	10	2.303			
MW-4	TOL	5	1.609			
MW-4	TOL	25	3.219			
MW-4	TOL	12	3.219	Shapiro-Wilk W Statistic	0.36188474	0.82860187
MW-4	TOL	2	0.693	p-value	1.9558E-12	7.8189E-05
MW-4	TOL	2.5	0.916	Count	43	35
MW-4	TOL	10	2.303			
MW-4	TOL	5	1.609			
MW-4	TX	1	0.000			
MW-4	TX	1	0.000			
MW-4	TX	4.2	1.435			
MW-4	TX	7	1.946			
MW-4	TX	11	2.398			
MW-4	TX	13	2.565			
MW-4	TX	14	2.639			
MW-4	TX	20	2.996			

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1. The first step in the process of creating a new product is to identify a market need. This involves conducting market research to understand what consumers want and what problems they are facing. Once a need is identified, the next step is to develop a concept that addresses this need. This is often done through brainstorming sessions with a team of designers and engineers. The concept is then refined through prototyping and testing. The final step is to launch the product into the market and monitor its performance. This involves tracking sales, customer feedback, and market trends to ensure the product remains competitive and relevant.

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Well	Cond	Value	Em value
MW-6B	TCE	1.5	0.410
MW-6B	TCE	2	0.693
MW-6B	TCE	2.6	0.956
MW-6B	TCE	2.7	0.993
MW-6B	TCE	2.7	0.993
MW-6B	TCE	2.9	1.065
MW-6B	TCE	5.9	1.775
MW-6B	TCE	6.9	1.932
MW-6B	TCE	9.3	2.230
MW-6B	TCE	10	2.303
MW-6B	TCE	19	2.944
MW-6B	TCE	29	3.367
MW-6B	TCE	29	3.367
MW-6B	TCE	37	3.611
MW-6B	TCE	46	3.829
MW-6B	TCE	51	3.932
MW-6B	TCE	52	3.951
MW-6B	TCE	57	4.043
MW-6B	TCE	59	4.078
MW-6B	TCE	61	4.111
MW-6B	TCE	8.6	2.152
MW-6B	TCE	2.3	0.833
MW-6B	TCE	8.8	2.175
MW-6B	TCE	2.6	0.956
MW-6B	TCE	14	2.639
MW-6B	TCE	2.9	1.065
MW-6B	TCE	2.3	0.833
MW-6B	TCE	6.1	1.808
MW-6B	TCE	5	1.609
MW-6B	TCE	5.2	1.649
MW-6B	TCE	6.6	1.887
MW-6B	TCE	6.4	1.856
MW-6B	TCE	17	2.833
MW-6B	TCE	7.7	2.041
MW-6B	TCE	4.3	1.459
MW-6B	TCE	9.9	3.219
MW-6B	TCE	17	2.833
MW-6B	TCE	31	3.434
MW-6B	TCE	8.2	2.104
MW-6B	TCE	12	2.485
MW-6B	TCR	0.01	-4.605
MW-6B	TCR	0.01	-4.605
MW-6B	TCR	0.01	-4.605
MW-6B	TCR	0.01	-4.605
MW-6B	TCR	0.01	-4.605
MW-6B	TCR	0.01	-4.605
MW-6B	TCR	0.01	-4.605
MW-6B	TCR	0.01	-2.300
MW-6B	TCR	0.011	-4.510
MW-6B	TCR	0.011	-4.510
MW-6B	TCR	0.012	-4.423
MW-6B	TCR	0.014	-4.269
MW-6B	TCR	0.014	-4.269
MW-6B	TCR	0.014	-4.269
MW-6B	TCR	0.019	-3.963
MW-6B	TCR	0.02	-3.912
MW-6B	TCR	0.02	-3.912
MW-6B	TCR	0.02	-3.912
MW-6B	TCR	0.04	-3.219

	Column1	Column2
Shapiro-Wilk W Statistic	0.75623183	0.9430241
p-value	9.3251E-07	0.04376803
Count	40	40

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MW-6B	TOL	1	0.000		
MW-6B	TX	0.01	-4.605		
MW-6B	TX	0.82	-0.199		
MW-6B	TX	1	0.000		
MW-6B	TX	1	0.000		
MW-6B	TX	1	0.000		
MW-6B	TX	1	0.000		
MW-6B	TX	1	0.000		
MW-6B	TX	1	0.000		
MW-6B	TX	1	0.000		
MW-6B	TX	1	0.000		
MW-6B	TX	1	0.000		
MW-6B	TX	1	0.000		
MW-6B	TX	1	0.000		
MW-6B	TX	1.9	0.642		
MW-6B	TX	5	1.609		
MW-6B	TX	5.5	1.705		
MW-6B	TX	8.2	2.100		
MW-6B	TX	13	2.565		
MW-6B	TX	88	4.477		
MW-6B	TX	110	4.700		
MW-6B	TX	6.2	1.825		
MW-6B	TX	5.1	1.629		
MW-6B	TX	1	0.000		
MW-6B	TX	53	3.970		
MW-6B	TX	50	3.912		
MW-6B	TX	3.5	1.253		
MW-6B	TX	2.8	1.030		
MW-6B	TX	6.4	1.856		
MW-6B	TX	1	0.000		
MW-6B	TX	1	0.000		
MW-6B	TX	1	0.000		
MW-6B	TX	39	3.664		
MW-6B	TX	6	1.792		
MW-6B	TX	1	0.000		
MW-6B	TX	1	3.219		
MW-6B	TX	29	3.367	Shapiro-Wilk W Statistic	0.53769084 0.86113723
MW-6B	TX	33.9	3.523	p-value	4.8461E-10 0.00537738
MW-6B	TX	1	0.000	Count	40 22
MW-6B	TX	2	0.693		
MW-7	BEN	0.5	-0.693		
MW-7	BEN	0.5	-0.693		
MW-7	BEN	0.5	-0.693		
MW-7	BEN	0.5	-0.693		
MW-7	BEN	0.5	-0.693		
MW-7	BEN	0.5	-0.693		
MW-7	BEN	0.5	-0.693		
MW-7	BEN	0.5	-0.693		
MW-7	BEN	0.5	-0.693		
MW-7	BEN	0.5	-0.693		
MW-7	BEN	0.5	-0.690		
MW-7	BEN	0.7	-0.357		
MW-7	BEN	0.7	-0.357		
MW-7	BEN	0.82	-0.199		
MW-7	BEN	0.88	-0.128		
MW-7	BEN	1	0.000		
MW-7	BEN	1	0.000		
MW-7	BEN	1	0.000		

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S-WSCC

Well	d	Value	Ln value			
MW-7	CD	0.005	-5.298			
MW-7	CD	0.005	-5.298			
MW-7	CD	0.005	-5.298			
MW-7	CD	0.005	-5.298			
MW-7	CD	0.005	-5.298			
MW-7	CD	0.005	-5.298			
MW-7	CD	0.005	-5.298			
MW-7	CD	0.005	3.219	Shapiro-Wilk W Statistic	0.53204057	0.26130322
MW-7	CD	0.0056	-5.185	p-value	1.2158E-10	1.4662E-13
MW-7	CD	0.005	-5.298	Count	44	44
MW-7	CD	0.01	-4.605			
MW-7	CD	0.005	-5.298			
MW-7	CU	0.009	-4.711			
MW-7	CU	0.01	-4.605			
MW-7	CU	0.02	-3.912			
MW-7	CU	0.02	-3.912			
MW-7	CU	0.02	-3.912			
MW-7	CU	0.02	-3.912			
MW-7	CU	0.02	-3.912			
MW-7	CU	0.02	-3.912			
MW-7	CU	0.02	-3.912			
MW-7	CU	0.02	-3.912			
MW-7	CU	0.02	-3.912			
MW-7	CU	0.02	-3.912			
MW-7	CU	0.02	-3.912			
MW-7	CU	0.02	-3.912			
MW-7	CU	0.02	-3.910			
MW-7	CU	0.023	-3.772			
MW-7	CU	0.032	-3.442			
MW-7	CU	0.05	-2.996			
MW-7	CU	0.05	-2.996			
MW-7	CU	0.14	-1.966			
MW-7	CU	0.19	-1.661			
MW-7	CU	0.21	-1.561			
MW-7	CU	0.65	-0.431			
MW-7	CU	0.026	-3.650			
MW-7	CU	0.02	-3.912			
MW-7	CU	0.02	-3.912			
MW-7	CU	0.079	-2.538			
MW-7	CU	0.043	-3.147			
MW-7	CU	0.02	-3.912			
MW-7	CU	0.02	-3.912			
MW-7	CU	0.036	-3.324			
MW-7	CU	0.029	-3.540			
MW-7	CU	0.02	-3.912			
MW-7	CU	0.02	-3.912			
MW-7	CU	0.025	-3.689			
MW-7	CU	0.044	-3.124			
MW-7	CU	0.02	-3.912			
MW-7	CU	0.02	-3.912			
MW-7	CU	0.42	3.219			
MW-7	CU	0.05	-2.996	Shapiro-Wilk W Statistic	0.43019431	0.6189642
MW-7	CU	0.042	-3.170	p-value	7.4929E-12	1.8582E-09
MW-7	CU	0.068	-2.688	Count	44	44
MW-7	CU	0.071	-2.645			
MW-7	EBN	1	0.000			
MW-7	EBN	1	0.000			
MW-7	EBN	1	0.000			
MW-7	EBN	1	0.000			

S-WSCC

Well	EBN	Value	Ln value
MW-7	EBN	1	0.000
MW-7	EBN	1	0.000
MW-7	EBN	1	0.000
MW-7	EBN	1	0.000
MW-7	EBN	1	0.000
MW-7	EBN	1	0.000
MW-7	EBN	1	0.000
MW-7	EBN	1	0.000
MW-7	EBN	1	0.000
MW-7	EBN	1.2	0.182
MW-7	EBN	2	0.693
MW-7	EBN	2.5	0.916
MW-7	EBN	2.5	0.916
MW-7	EBN	5	1.609
MW-7	EBN	5.1	1.630
MW-7	EBN	7.2	1.974
MW-7	EBN	7.7	2.041
MW-7	EBN	33	3.497
MW-7	EBN	90	4.500
MW-7	EBN	210	5.347
MW-7	EBN	8.7	2.163
MW-7	EBN	1.3	0.262
MW-7	EBN	2.1	0.742
MW-7	EBN	3.8	1.335
MW-7	EBN	4.9	1.589
MW-7	EBN	11	2.398
MW-7	EBN	1.6	0.470
MW-7	EBN	1.4	0.336
MW-7	EBN	1.7	0.531
MW-7	EBN	1.2	0.182
MW-7	EBN	1	0.000
MW-7	EBN	1	0.000
MW-7	EBN	5.2	1.649
MW-7	EBN	1	0.000
MW-7	EBN	1	0.000
MW-7	EBN	1	3.219
MW-7	EBN	2.5	0.916
MW-7	EBN	11	2.398
MW-7	EBN	1.3	0.262
MW-7	EBN	2	0.693
MW-7	HCR	0.01	-4.605
MW-7	HCR	0.02	-3.912
MW-7	HCR	0.02	-3.912
MW-7	HCR	0.02	-3.912
MW-7	HCR	0.02	-3.912
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MW-7	HCR	0.02	-3.912
MW-7	HCR	0.02	-3.912
MW-7	HCR	0.02	-3.910

	Column1	Column2
Shapiro-Wilk W Statistic	0.2839071	0.87060495
p-value	2.3851E-13	0.00303032
Count	44	27

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840
84

Well	d	Value	Ln value
MW-7	TOL	1	0.000
MW-7	TOL	1	0.000
MW-7	TOL	1	0.000
MW-7	TOL	1	0.000
MW-7	TOL	1	0.000
MW-7	TOL	1	0.000
MW-7	TOL	1	0.000
MW-7	TOL	1	0.000
MW-7	TOL	1	0.000
MW-7	TOL	1	0.000
MW-7	TOL	1.4	0.337
MW-7	TOL	2	0.693
MW-7	TOL	2.5	0.916
MW-7	TOL	2.5	0.916
MW-7	TOL	2.5	0.916
MW-7	TOL	5	1.609
MW-7	TOL	10	2.303
MW-7	TOL	7	1.946
MW-7	TOL	1	0.000
MW-7	TOL	1	0.000
MW-7	TOL	1	0.000
MW-7	TOL	4.2	1.435
MW-7	TOL	1.3	0.262
MW-7	TOL	1	0.000
MW-7	TOL	1	0.000
MW-7	TOL	1	0.000
MW-7	TOL	1.1	0.095
MW-7	TOL	1	0.000
MW-7	TOL	1	0.000
MW-7	TOL	2.2	0.788
MW-7	TOL	1	0.000
MW-7	TOL	1	0.000
MW-7	TOL	1	3.219 Shapiro-Wilk W Statistic
MW-7	TOL	2	0.693 p-value
MW-7	TOL	3	1.099 Count
MW-7	TOL	1	0.000
MW-7	TOL	2	0.693
MW-7	TX	1	0.000
MW-7	TX	1	0.000
MW-7	TX	1	0.000
MW-7	TX	1	0.000
MW-7	TX	1	0.000
MW-7	TX	1	0.000
MW-7	TX	1	0.000
MW-7	TX	1	0.000
MW-7	TX	1	0.000
MW-7	TX	1	0.000
MW-7	TX	1	0.000
MW-7	TX	1	0.000
MW-7	TX	1	0.000
MW-7	TX	1	0.000
MW-7	TX	1	0.000
MW-7	TX	1.2	0.182
MW-7	TX	2	0.693
MW-7	TX	2	0.693
MW-7	TX	3.6	1.281
MW-7	TX	5	1.609
MW-7	TX	5	1.609
MW-7	TX	5	1.609

S-WSCC

Well	Yd	Value	Ln value
MW-7	TX	5.5	1.700
MW-7	TX	5.6	1.723
MW-7	TX	10	2.303
MW-7	TX	10	2.303
MW-7	TX	1	0.000
MW-7	TX	3.4	1.224
MW-7	TX	1.4	0.336
MW-7	TX	10	2.303
MW-7	TX	14	2.639
MW-7	TX	2.7	0.993
MW-7	TX	1.5	0.405
MW-7	TX	2.8	1.030
MW-7	TX	1	0.000
MW-7	TX	1	0.000
MW-7	TX	1	0.000
MW-7	TX	6.8	1.917
MW-7	TX	1.8	0.588
MW-7	TX	1	0.000
MW-7	TX	1	3.219
MW-7	TX	2.5	0.916
MW-7	TX	6.8	1.917
MW-7	TX	1	0.000
MW-7	TX	4	1.386

	Column1	Column2
Shapiro-Wilk W Statistic	0.70951194	0.97531943
p-value	5.1295E-08	0.79661041
Count	44	24

MW-9	BEN	0.05	-2.996
MW-9	BEN	0.05	-2.996
MW-9	BEN	0.5	-0.693
MW-9	BEN	0.5	-0.693
MW-9	BEN	0.5	-0.693
MW-9	BEN	0.5	-0.693
MW-9	BEN	0.5	-0.693
MW-9	BEN	0.5	-0.693
MW-9	BEN	0.5	-0.693
MW-9	BEN	0.7	-0.357
MW-9	BEN	0.7	-0.357
MW-9	BEN	1	0.000
MW-9	BEN	2.5	0.916
MW-9	BEN	2.5	0.916
MW-9	BEN	2.5	0.916
MW-9	BEN	2.5	0.916
MW-9	BEN	10	2.303
MW-9	BEN	16	2.773
MW-9	BEN	50	3.912
MW-9	BEN	50	3.912
MW-9	BEN	500	6.210
MW-9	BEN	500	6.215
MW-9	BEN	1000	6.908
MW-9	BEN	1000	6.908
MW-9	BEN	250	5.521
MW-9	BEN	50	3.912
MW-9	BEN	10	2.303
MW-9	BEN	25	3.219
MW-9	BEN	50	3.912
MW-9	BEN	3.3	1.194
MW-9	BEN	4.6	1.526
MW-9	BEN	50	3.912
MW-9	BEN	2.5	0.916
MW-9	BEN	5	1.609
MW-9	BEN	25	3.219
MW-9	BEN	25	3.219

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[illegible]

[illegible]

[illegible]

S-WSCC

Well	d	Value	Ln_value			
MW-9	HCR	0.02	-3.912			
MW-9	HCR	0.02	-3.912		Column1	Column2
MW-9	HCR	3.3	3.219	Shapiro-Wilk W Statistic	0.47078881	0.6604256
MW-9	HCR	3.3	1.194	p-value	2.1754E-11	7.9053E-09
MW-9	HCR	0.01	-4.605	Count	44	44
MW-9	HCR	5.8	1.758			
MW-9	HCR	4	1.386			
MW-9	TCE	17	2.833			
MW-9	TCE	24	3.178			
MW-9	TCE	26	3.258			
MW-9	TCE	26	3.258			
MW-9	TCE	41	3.714			
MW-9	TCE	45	3.807			
MW-9	TCE	52	3.951			
MW-9	TCE	55	4.007			
MW-9	TCE	57	4.043			
MW-9	TCE	64	4.159			
MW-9	TCE	100	4.605			
MW-9	TCE	100	4.605			
MW-9	TCE	110	4.701			
MW-9	TCE	110	4.701			
MW-9	TCE	120	4.788			
MW-9	TCE	150	5.011			
MW-9	TCE	200	5.298			
MW-9	TCE	230	5.438			
MW-9	TCE	270	5.598			
MW-9	TCE	350	5.850			
MW-9	TCE	390	5.966			
MW-9	TCE	1000	6.908			
MW-9	TCE	1000	6.908			
MW-9	TCE	1100	7.003			
MW-9	TCE	310	5.737			
MW-9	TCE	670	6.507			
MW-9	TCE	540	6.292			
MW-9	TCE	320	5.768			
MW-9	TCE	500	6.215			
MW-9	TCE	580	6.363			
MW-9	TCE	570	6.346			
MW-9	TCE	470	6.153			
MW-9	TCE	400	5.991			
MW-9	TCE	770	6.646			
MW-9	TCE	850	6.745			
MW-9	TCE	600	6.397			
MW-9	TCE	270	5.598			
MW-9	TCE	390	5.966		Column1	Column2
MW-9	TCE	1300	7.170	Shapiro-Wilk W Statistic	0.88833191	0.93299261
MW-9	TCE	1200	3.219	p-value	0.0004858	0.01328895
MW-9	TCE	550	6.310	Count	44	44
MW-9	TCE	350	5.858			
MW-9	TCE	810	6.697			
MW-9	TCE	280	5.635			
MW-9	TCR	0.0081	-4.816			
MW-9	TCR	0.01	-4.605			
MW-9	TCR	0.01	-4.605			
MW-9	TCR	0.01	-4.605			
MW-9	TCR	0.01	-4.605			
MW-9	TCR	0.01	-4.605			
MW-9	TCR	0.01	-4.605			

Well	d	Value	Ln value
MW-9	TCR	0.01	-4.605
MW-9	TCR	0.01	-4.605
MW-9	TCR	0.01	-4.605
MW-9	TCR	0.01	-2.300
MW-9	TCR	0.027	-3.612
MW-9	TCR	0.04	-3.219
MW-9	TCR	0.057	-2.865
MW-9	TCR	0.06	-2.813
MW-9	TCR	0.07	-2.659
MW-9	TCR	0.085	-2.465
MW-9	TCR	0.17	-1.772
MW-9	TCR	0.19	-1.661
MW-9	TCR	0.33	-1.109
MW-9	TCR	0.81	-0.211
MW-9	TCR	1.8	0.588
MW-9	TCR	2.2	0.789
MW-9	TCR	0.01	-4.605
MW-9	TCR	0.01	-4.605
MW-9	TCR	0.01	-4.605
MW-9	TCR	0.01	-4.605
MW-9	TCR	0.01	-4.605
MW-9	TCR	0.01	-4.605
MW-9	TCR	0.01	-4.605
MW-9	TCR	0.01	-4.605
MW-9	TCR	0.01	-4.605
MW-9	TCR	0.01	-4.605
MW-9	TCR	0.01	-4.605
MW-9	TCR	0.048	-3.037
MW-9	TCR	0.01	-4.605
MW-9	TCR	0.01	-4.605
MW-9	TCR	0.01	-4.605
MW-9	TCR	0.01	-4.605
MW-9	TCR	1.3	3.219
MW-9	TCR	0.01	-4.605
MW-9	TCR	0.64	-0.446
MW-9	TCR	0.64	-0.446
MW-9	TCR	4.2	1.435
MW-9	TOL	0.5	-0.693
MW-9	TOL	1	0.000
MW-9	TOL	1	0.000
MW-9	TOL	1	0.000
MW-9	TOL	1	0.000
MW-9	TOL	1	0.000
MW-9	TOL	1	0.000
MW-9	TOL	1	0.000
MW-9	TOL	1	0.000
MW-9	TOL	2.5	0.916
MW-9	TOL	2.5	0.916
MW-9	TOL	2.5	0.916
MW-9	TOL	5	1.609
MW-9	TOL	6.6	1.887
MW-9	TOL	33	3.497
MW-9	TOL	48	3.871
MW-9	TOL	400	5.992
MW-9	TOL	2800	7.937
MW-9	TOL	5100	8.537
MW-9	TOL	17000	9.741
MW-9	TOL	34000	10.434
MW-9	TOL	56000	10.933
MW-9	TOL	83000	11.327

	Column1	Column2
Shapiro-Wilk W Statistic	0.43334759	0.73241657
p-value	8.124E-12	1.3147E-07
Count	44	44

S-WSCC

Well	d	Value	Ln value
MW-9	TOL	8200	9.012
MW-9	TOL	100	4.605
MW-9	TOL	69	4.234
MW-9	TOL	110	4.700
MW-9	TOL	100	4.605
MW-9	TOL	5.5	1.705
MW-9	TOL	2	0.693
MW-9	TOL	100	4.605
MW-9	TOL	5	1.609
MW-9	TOL	10	2.303
MW-9	TOL	50	3.912
MW-9	TOL	150	5.011
MW-9	TOL	10	2.303
MW-9	TOL	10	2.303
MW-9	TOL	25	3.219
MW-9	TOL	12	3.219
MW-9	TOL	2	0.693
MW-9	TOL	1	0.000
MW-9	TOL	25	3.219
MW-9	TOL	5	1.609
MW-9	TX	1	0.000
MW-9	TX	1	0.000
MW-9	TX	1	0.000
MW-9	TX	1	0.000
MW-9	TX	1	0.000
MW-9	TX	1	0.000
MW-9	TX	1	0.000
MW-9	TX	1	0.000
MW-9	TX	5	1.609
MW-9	TX	5	1.609
MW-9	TX	5	1.609
MW-9	TX	9	2.197
MW-9	TX	45	3.807
MW-9	TX	74	4.304
MW-9	TX	92	4.522
MW-9	TX	220	5.394
MW-9	TX	5300	8.576
MW-9	TX	6190	8.731
MW-9	TX	9200	9.127
MW-9	TX	24000	10.086
MW-9	TX	32000	10.374
MW-9	TX	34000	10.430
MW-9	TX	40000	10.597
MW-9	TX	58000	10.968
MW-9	TX	2000	7.601
MW-9	TX	480	6.174
MW-9	TX	340	5.829
MW-9	TX	1900	7.550
MW-9	TX	6100	8.716
MW-9	TX	22	3.091
MW-9	TX	4.3	1.459
MW-9	TX	350	5.858
MW-9	TX	5	1.609
MW-9	TX	10	2.303
MW-9	TX	860	6.757
MW-9	TX	4800	8.476
MW-9	TX	260	5.561
MW-9	TX	10	2.303
MW-9	TX	25	3.219

	Column1	Column2
Shapiro-Wilk W Statistic	0.3501995	0.89800506
p-value	1.4897E-12	0.00406461
Count	43	34

	Column1	Column2
Shapiro-Wilk W Statistic	0.47786645	0.90893088

S-WSCC

Well	d	Value	Ln value		
MW-9	TX	12	3.219	p-value	2.6348E-11
MW-9	TX	83	4.419	Count	0.00604202
MW-9	TX	5	1.609		44
MW-9	TX	25	3.219		36
MW-9	TX	10	2.303		

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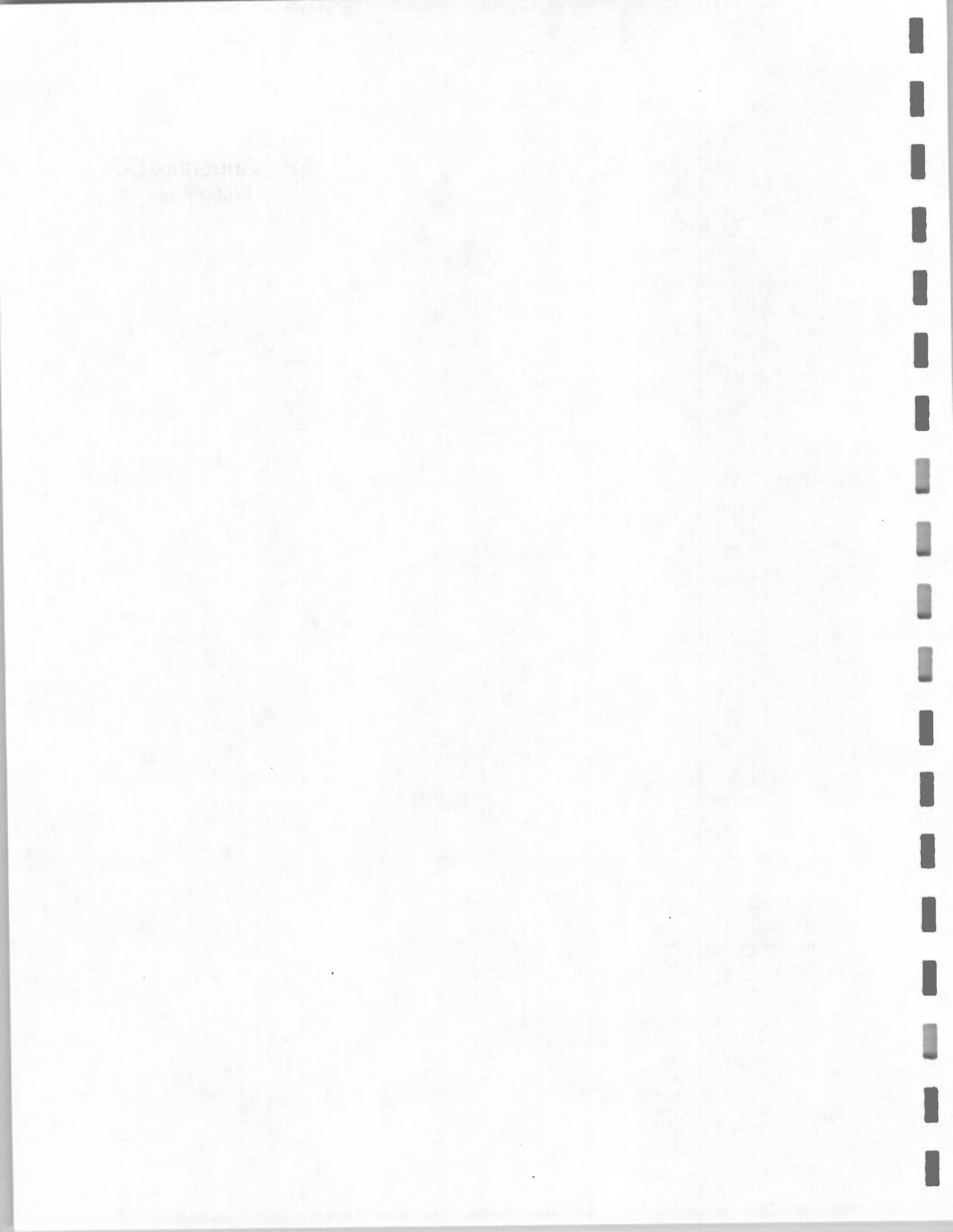
S-WSCC

S-WSCC

S-WSCC

S-WSCC

Appendix E-3
Probability Plots



IMPORT successfully completed.

IMPORT successfully completed.

SYSTAT Rectangular file O:\2279-111\Oct99\scc.SYD,
created Sat Dec 11, 1999 at 13:51:28, contains variables:

TYPE\$	WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE
HD_LN_VALU	VAL_FLAG\$	DATE\$	DATE_NO		

The following results are for:

PARAM_ID\$ = TCE

Data for the following results were selected according to:
(PARAM_ID\$= "TCE")

408 cases and 10 variables processed.

The following results are for:

PARAM_ID\$ = TCE

Data for the following results were selected according to:
(PARAM_ID\$= "TCE")

408 cases and 10 variables processed.

The following results are for:

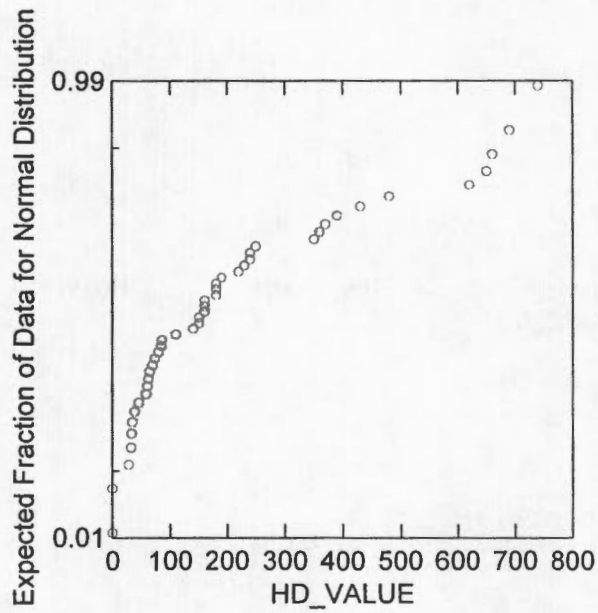
WELL\$ = MW-11

Data for the following results were selected according to:
(PARAM_ID\$= "TCE")

The following results are for:

WELL\$ = MW-11

Data for the following results were selected according to:
(PARAM_ID\$= "TCE")

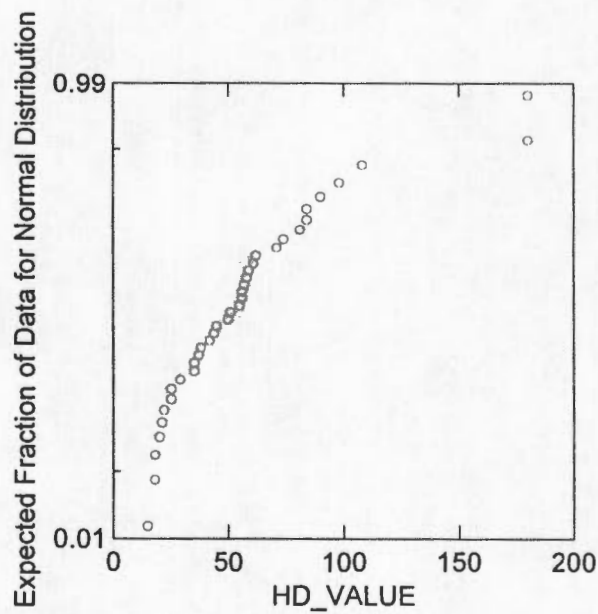


The following results are for:

WELL\$ = MW-14S

Data for the following results were selected according to:

(PARAM_ID\$= "TCE")

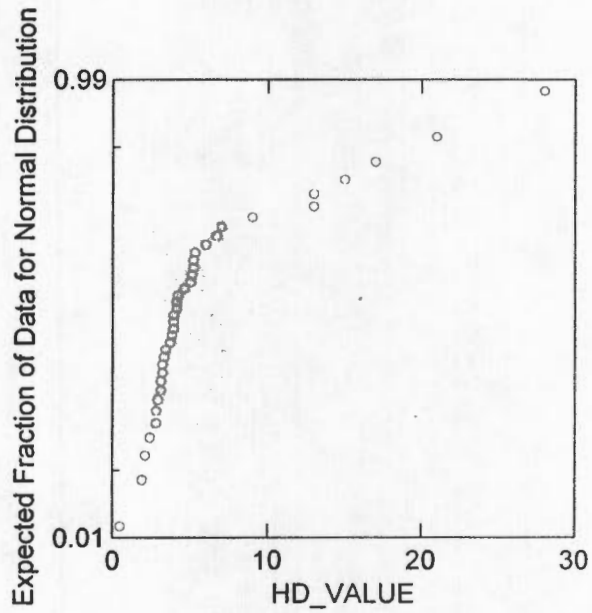


The following results are for:

WELL\$ = MW-15S

Data for the following results were selected according to:

(PARAM_ID\$= "TCE")

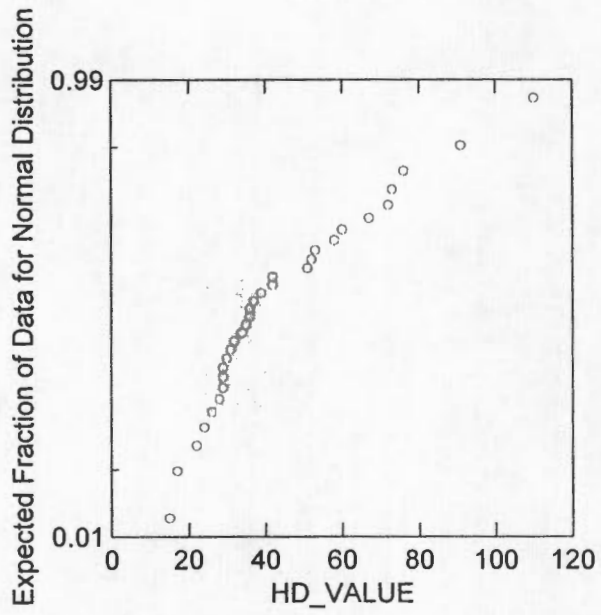


The following results are for:

WELL\$ = MW-16

Data for the following results were selected according to:

(PARAM_ID\$= "TCE")

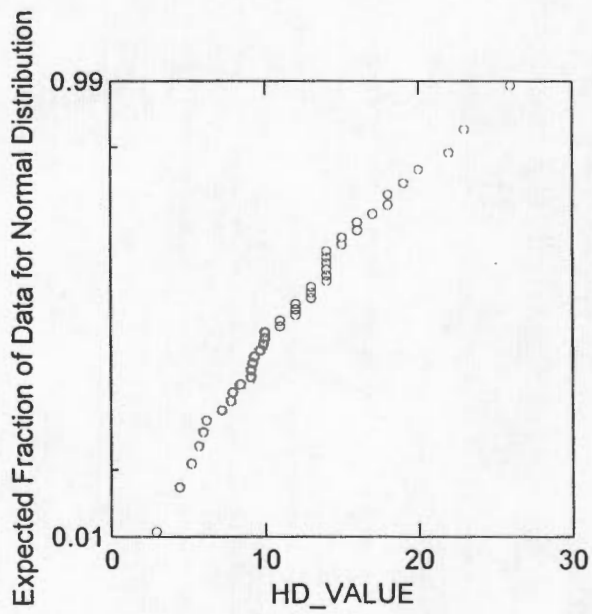


The following results are for:

WELL\$ = MW-1S

Data for the following results were selected according to:

(PARAM_ID\$="TCE")

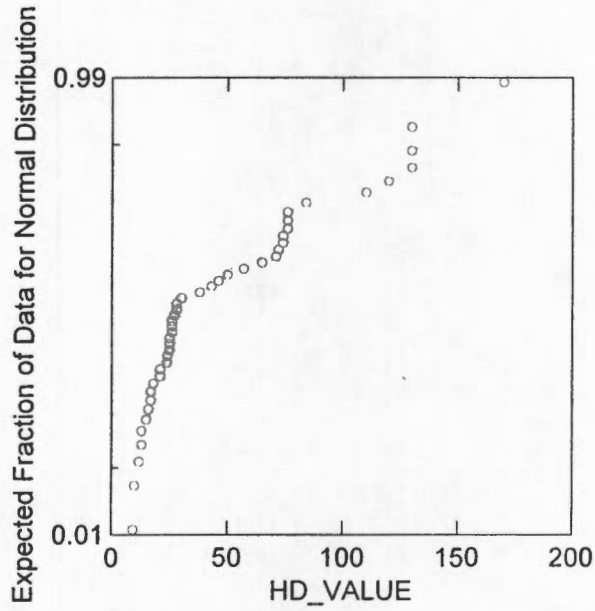


The following results are for:

WELL\$ = MW-3

Data for the following results were selected according to:

(PARAM_ID\$= "TCE")

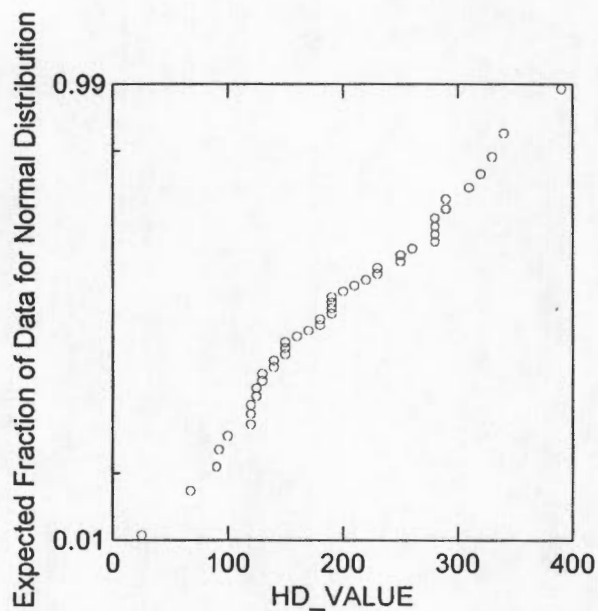


The following results are for:

WELL\$ = MW-4

Data for the following results were selected according to:

(PARAM_ID\$= "TCE")

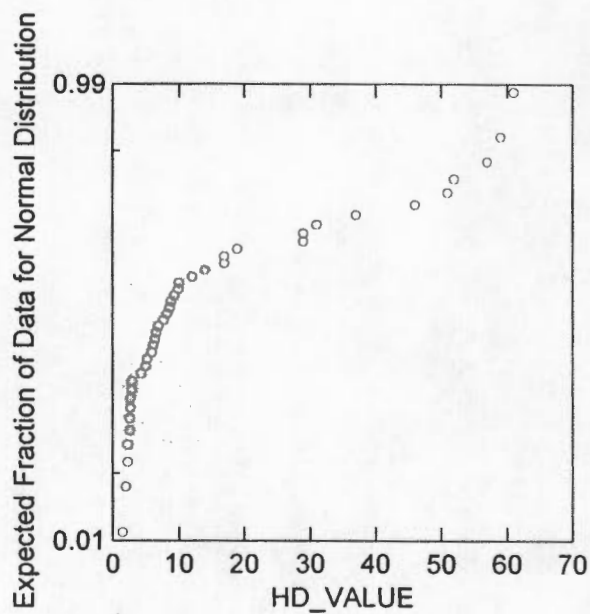


The following results are for:

WELL\$ = MW-6B

Data for the following results were selected according to:

(PARAM_ID\$= "TCE")

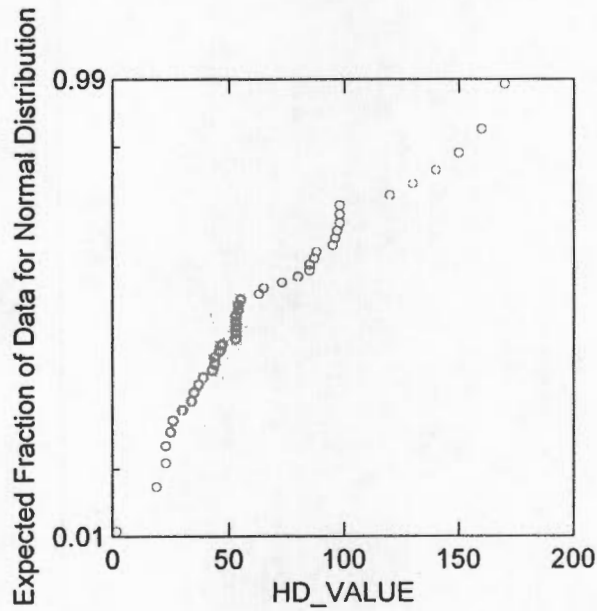


The following results are for:

WELL\$ = MW-7

Data for the following results were selected according to:

(PARAM_ID\$= "TCE")

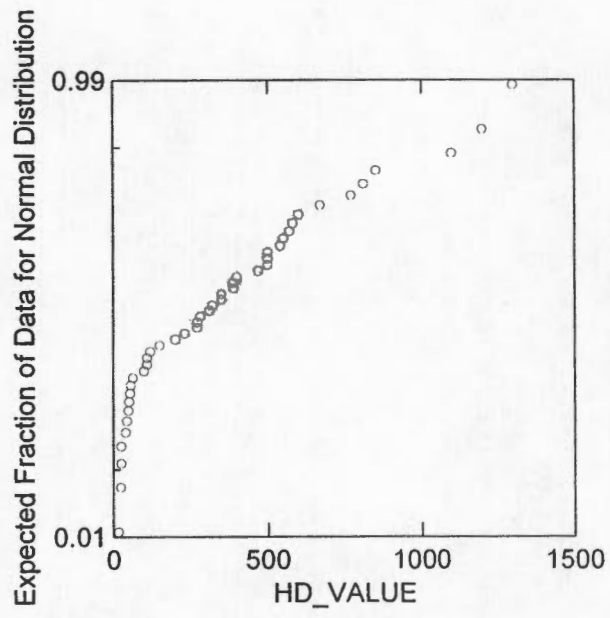


The following results are for:

WELL\$ = MW-9

Data for the following results were selected according to:

(PARAM_ID\$= "TCE")



IMPORT successfully completed.

IMPORT successfully completed.

SYSTAT Rectangular file O:\2279-111\Oct99\scc.SYD,
created Sat Dec 11, 1999 at 13:51:28, contains variables:

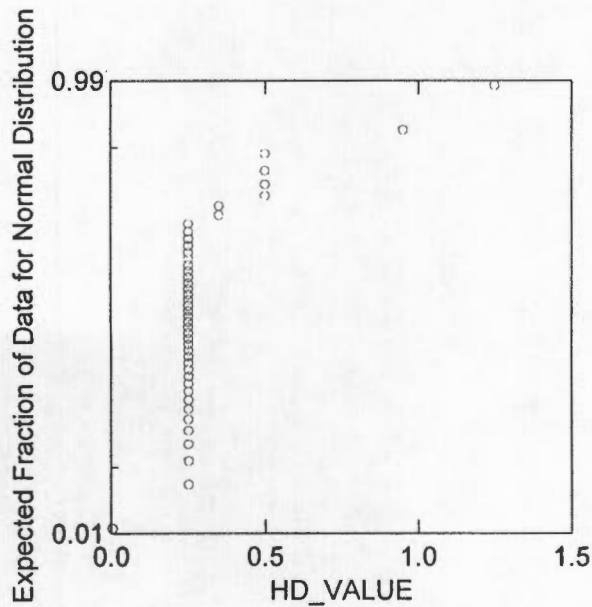
TYPE\$	WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE
HD_LN_VALU	VAL_FLAG\$	DATE\$	DATE_NO		

Data for the following results were selected according to:
(WELL\$= "MW-1s")

WARNING

The file O:\2279-111\Oct99\scc.SYD was read for processing, and
its contents have been replaced by saving
the processed data into it.

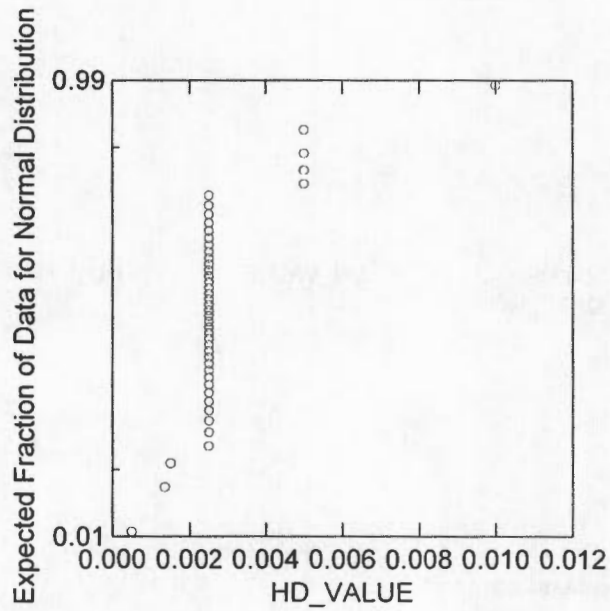
3662 cases and 10 variables processed and saved.
Data for the following results were selected according to:
(WELL\$= "MW-1S")



The following results are for:

PARAM_ID\$ = CD

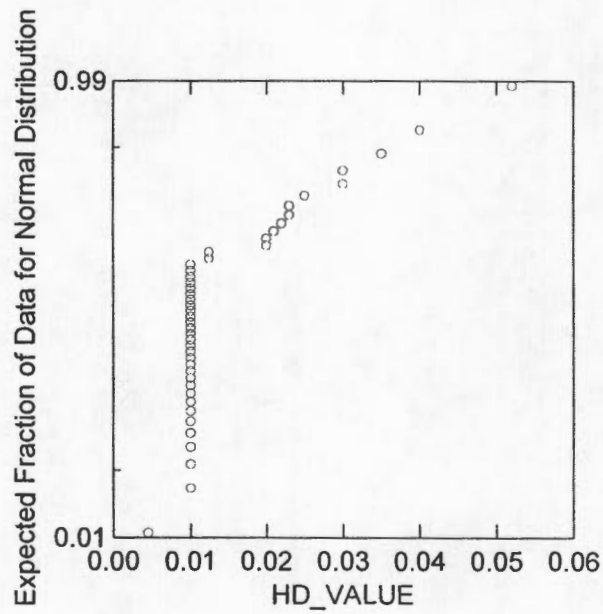
Data for the following results were selected according to:
(WELL\$= "MW-1S")



The following results are for:

PARAM_ID\$ = CU

Data for the following results were selected according to:
(WELL\$= "MW-1S")

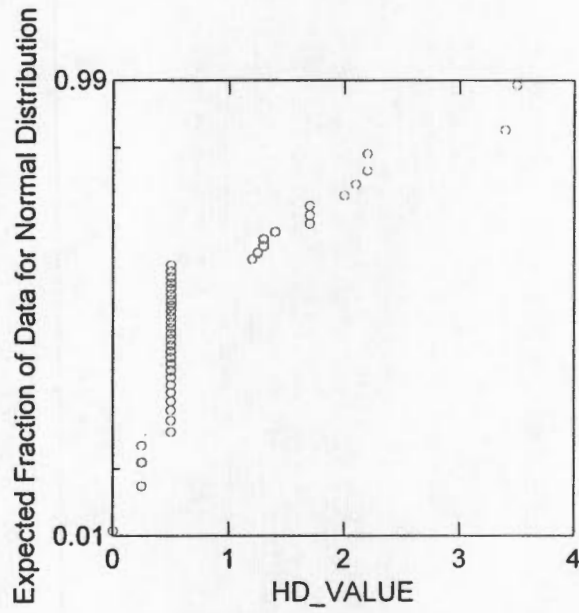


The following results are for:

PARAM_ID\$ = EBN

Data for the following results were selected according to:

(WELL\$= "MW-1S")

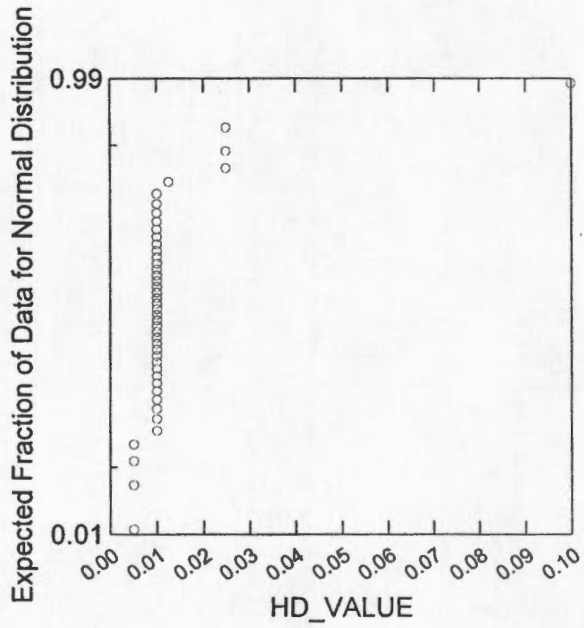


The following results are for:

PARAM_ID\$ = HCR

Data for the following results were selected according to:

(WELL\$= "MW-1S")

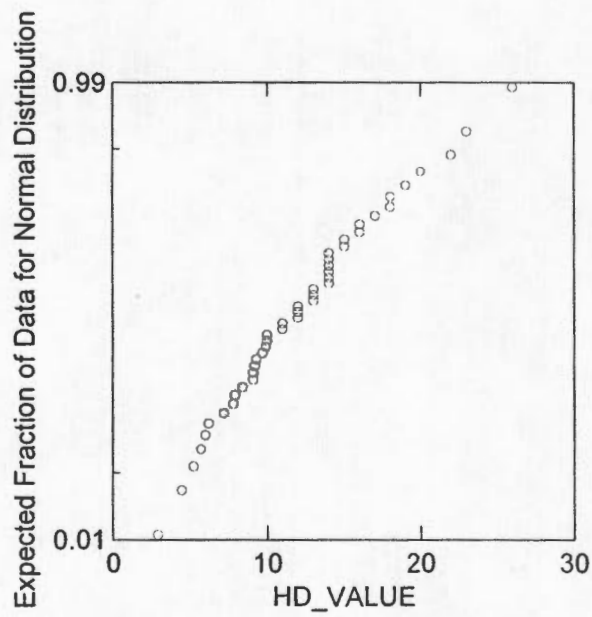


The following results are for:

PARAM_ID\$ = TCE

Data for the following results were selected according to:

(WELL\$ = "MW-1S")

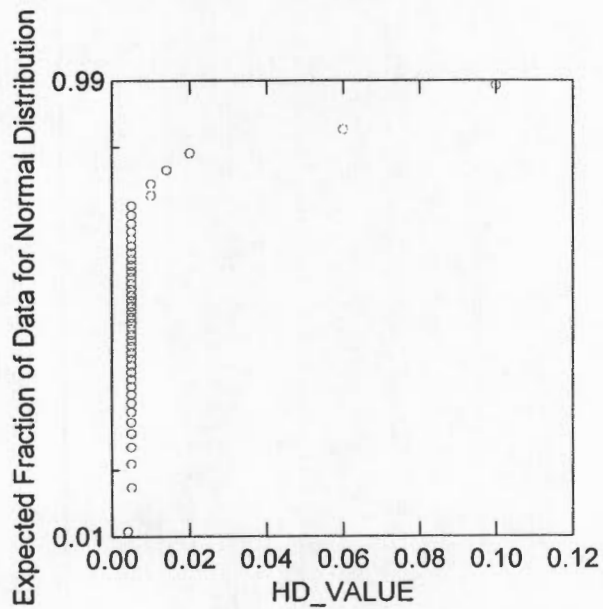


The following results are for:

PARAM_ID\$ = TCR

Data for the following results were selected according to:

(WELL\$= "MW-1S")

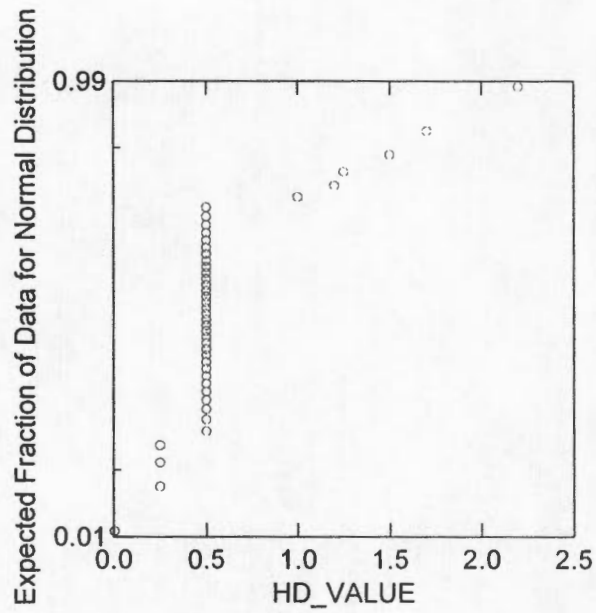


The following results are for:

PARAM_ID\$ = TOL

Data for the following results were selected according to:

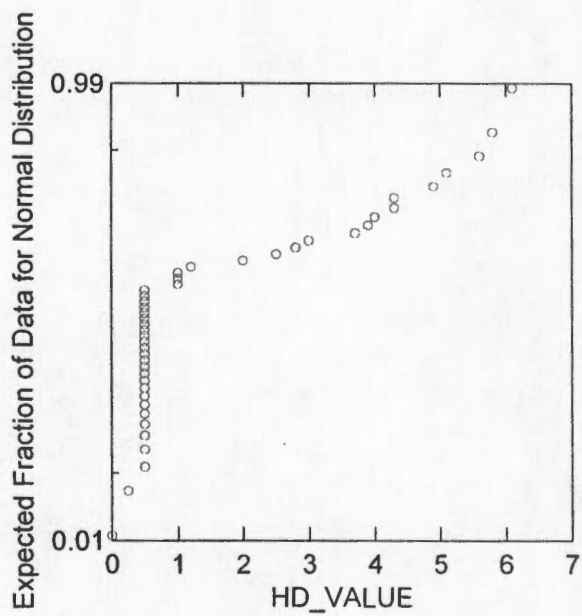
(WELL\$= "MW-1S")



The following results are for:

PARAM_ID\$ = TX

Data for the following results were selected according to:
(WELL\$= "MW-1S")



IMPORT successfully completed.

IMPORT successfully completed.

SYSTAT Rectangular file O:\2279-111\Oct99\scc.SYD,
created Sat Dec 11, 1999 at 13:51:28, contains variables:

TYPE\$	WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE
HD_LN_VALU	VAL_FLAG\$	DATE\$	DATE_NO		

Data for the following results were selected according to:
(WELL\$= "MW-1s")

ERROR

Unable to open the file

O:\2279-111\Oct99\Scc.xls

ERROR

Unable to read input file.

IMPORT successfully completed.

3662 cases and 10 variables processed and saved.

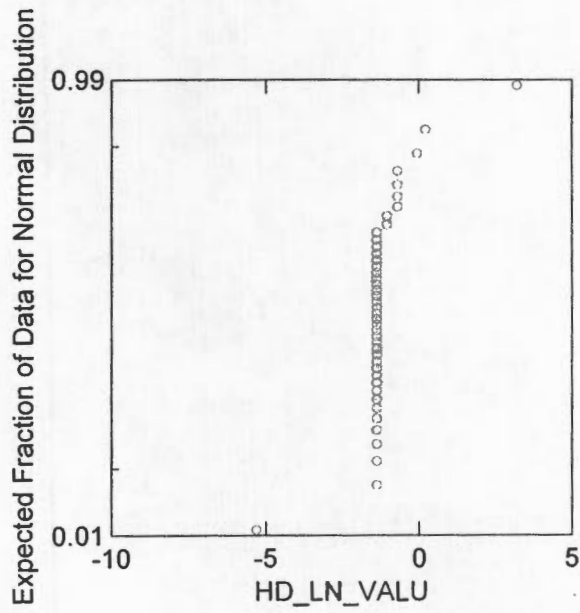
SYSTAT Rectangular file O:\2279-111\Oct99\scc.SYD,
created Sat Dec 11, 1999 at 14:28:52, contains variables:

TYPE\$	WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE
HD_LN_VALU	VAL_FLAG\$	DATE\$	DATE_NO		

The following results are for:

PARAM_ID\$ = BEN

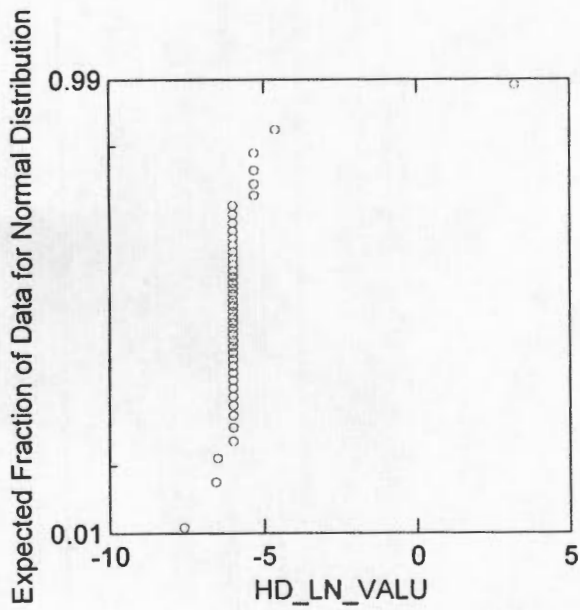
Data for the following results were selected according to:
(WELL\$= "MW-1S")



The following results are for:

PARAM_ID\$ = CD

Data for the following results were selected according to:
(WELL\$= "MW-1S")

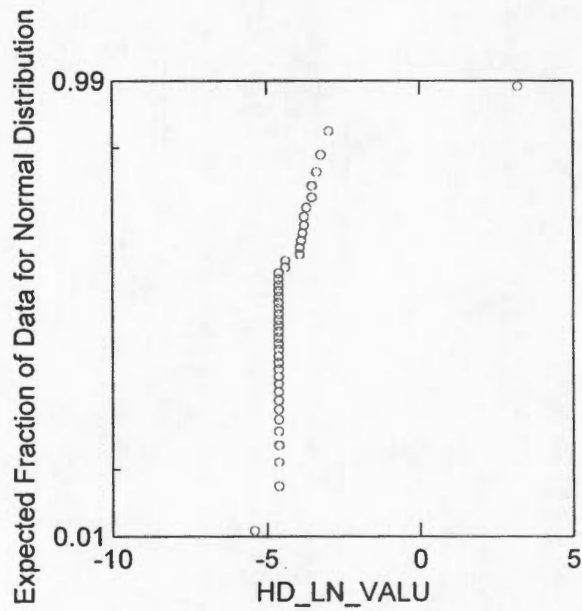


The following results are for:

PARAM_ID\$ = CU

Data for the following results were selected according to:

(WELL\$= "MW-1S")

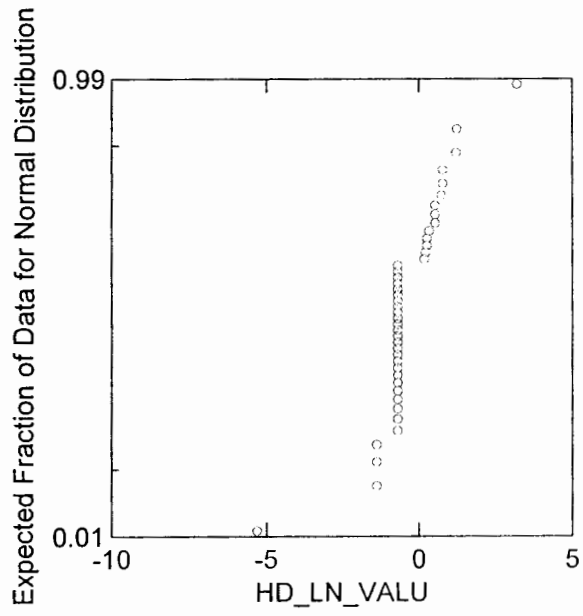


The following results are for:

PARAM_ID\$ = EBN

Data for the following results were selected according to:

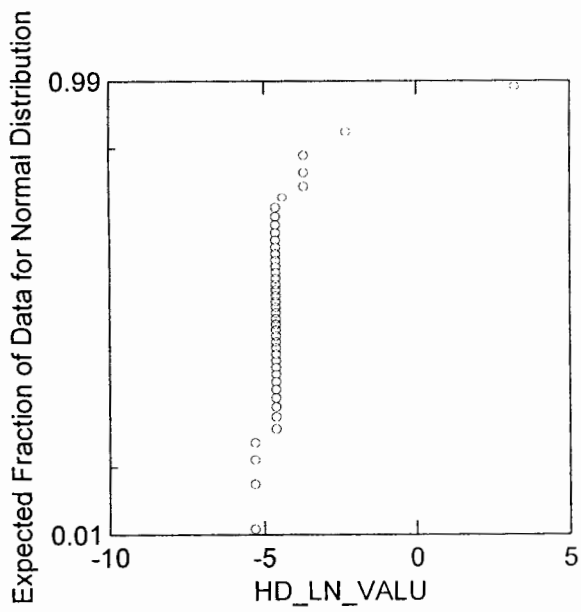
(WELL\$= "MW-1S")



The following results are for:

PARAM_ID\$ = HCR

Data for the following results were selected according to:
(WELL\$= "MW-1S")

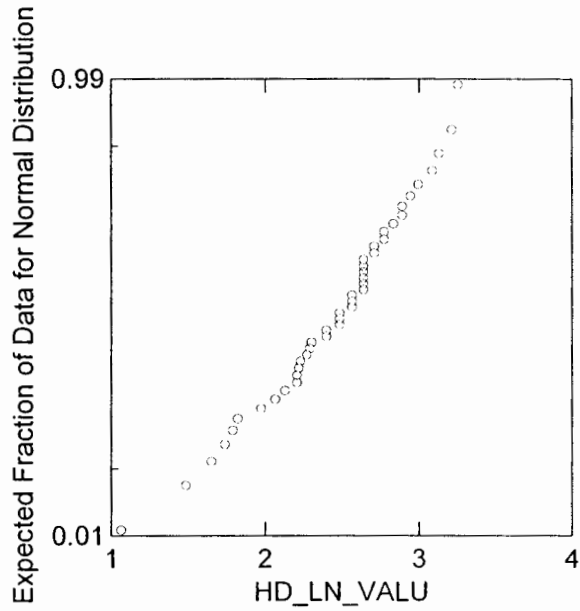


The following results are for:

PARAM_ID\$ = TCE

Data for the following results were selected according to:

(WELL\$= "MW-1S")

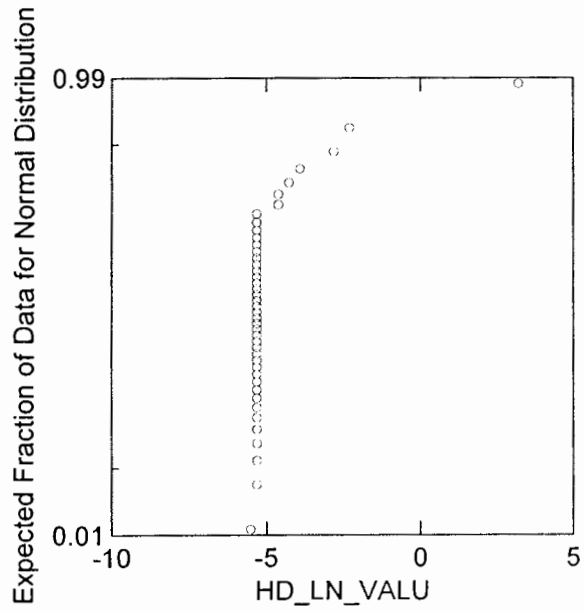


The following results are for:

PARAM_ID\$ = TCR

Data for the following results were selected according to:

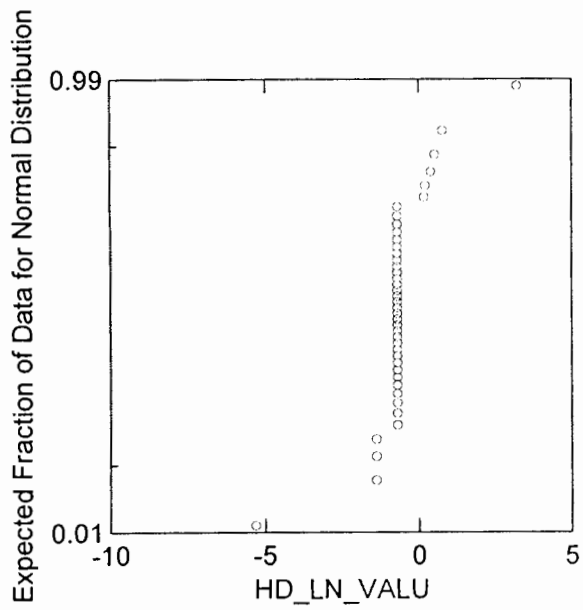
(WELL\$= "MW-1S")



The following results are for:

PARAM_ID\$ = TOL

Data for the following results were selected according to:
(WELL\$= "MW-1S")

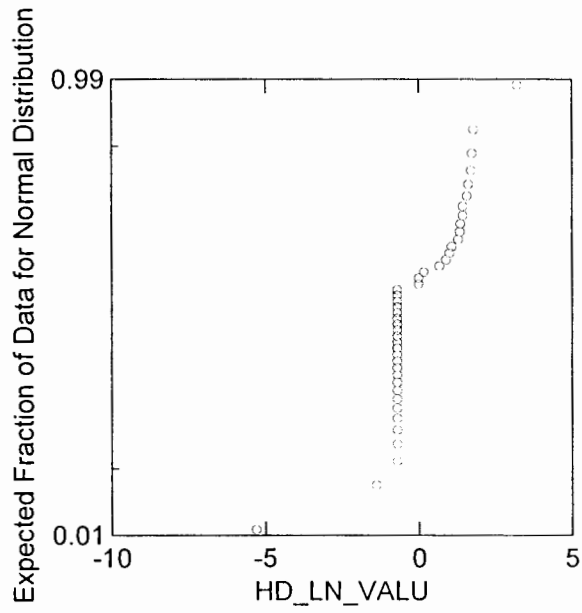


The following results are for:

PARAM_ID\$ = TX

Data for the following results were selected according to:

(WELL\$= "MW-1S")



IMPORT successfully completed.

IMPORT successfully completed.

SYSTAT Rectangular file O:\2279-111\Oct99\scc.SYD,
created Sat Dec 11, 1999 at 13:51:28, contains variables:

TYPE\$	WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE
HD_LN_VALU	VAL_FLAG\$	DATE\$	DATE_NO		

Data for the following results were selected according to:
(WELL\$= "MW-1s")

ERROR

Unable to open the file

O:\2279-111\Oct99\Scc.xls

ERROR

Unable to read input file.

IMPORT successfully completed.

3662 cases and 10 variables processed and saved.

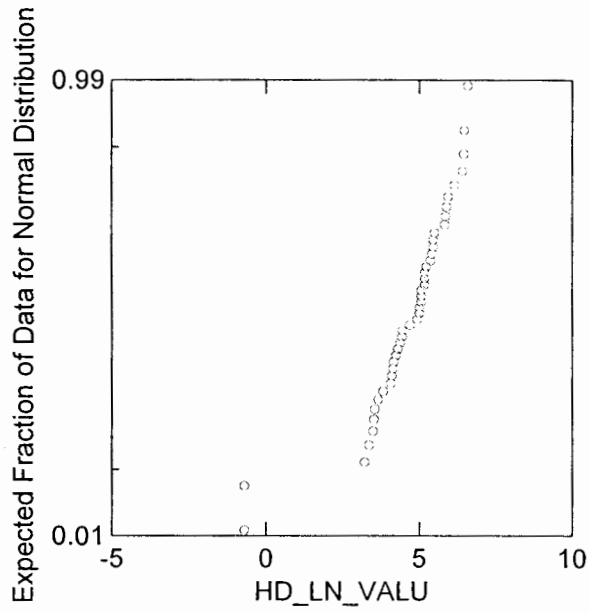
SYSTAT Rectangular file O:\2279-111\Oct99\scc.SYD,
created Sat Dec 11, 1999 at 14:28:52, contains variables:

TYPE\$	WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE
HD_LN_VALU	VAL_FLAG\$	DATE\$	DATE_NO		

The following results are for:

PARAM_ID\$ = BEN

Data for the following results were selected according to:
(WELL\$= "MW-1S")

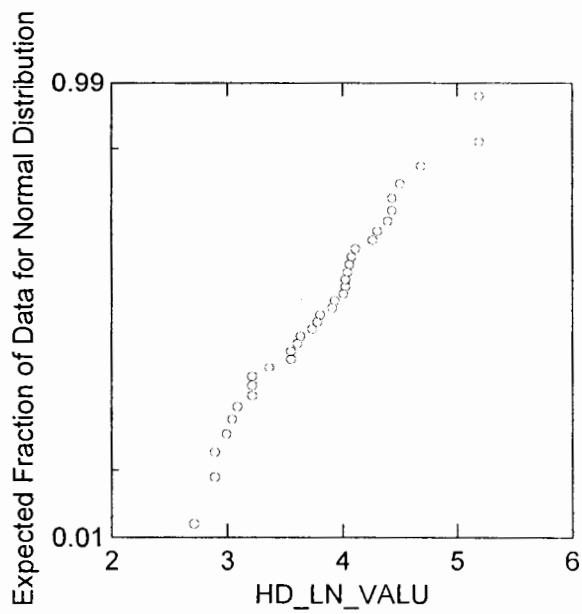


The following results are for:

WELL\$ = MW-14S

Data for the following results were selected according to:

(PARAM_ID\$= "TCE")

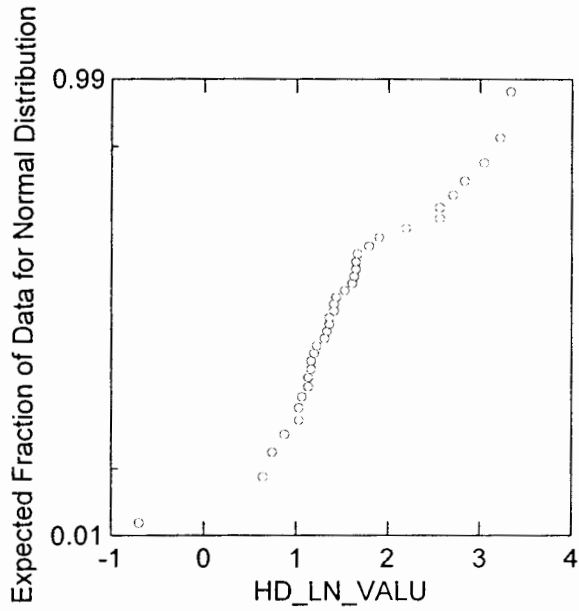


The following results are for:

WELL\$ = MW-15S

Data for the following results were selected according to:

(PARAM_ID\$= "TCE")

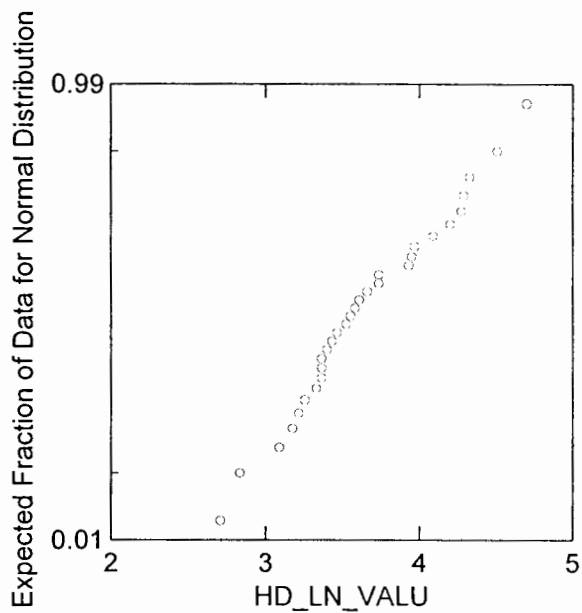


The following results are for:

WELL\$ = MW-16

Data for the following results were selected according to:

(PARAM_ID\$= "TCE")

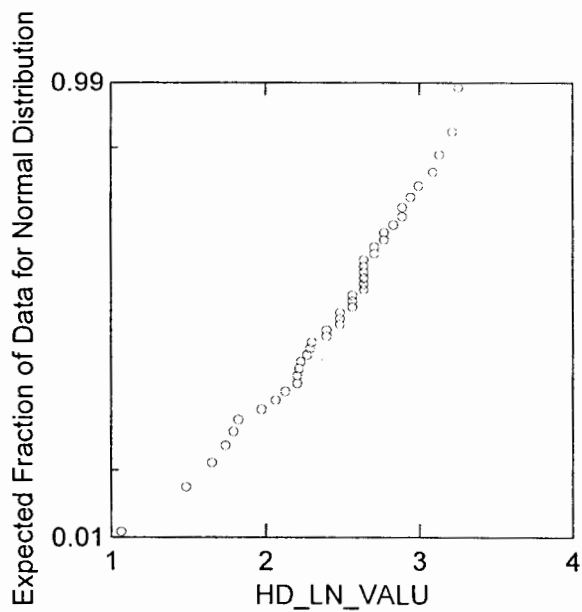


The following results are for:

WELL\$ = MW-1S

Data for the following results were selected according to:

(PARAM_ID\$= "TCE")

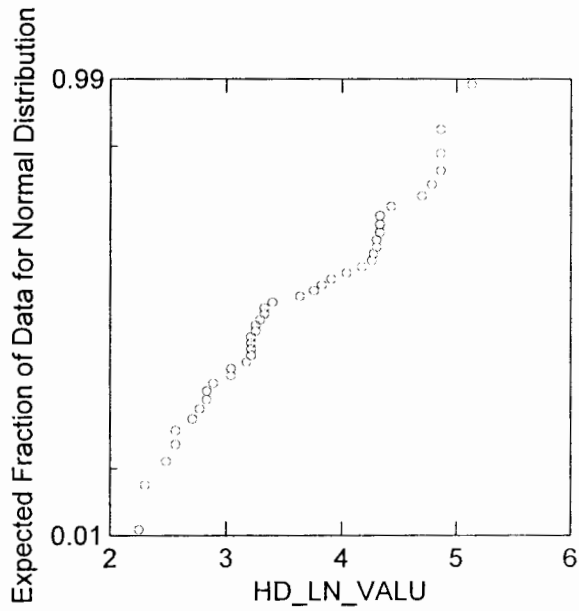


The following results are for:

WELL\$ = MW-3

Data for the following results were selected according to:

(PARAM_ID\$ = "TCE")

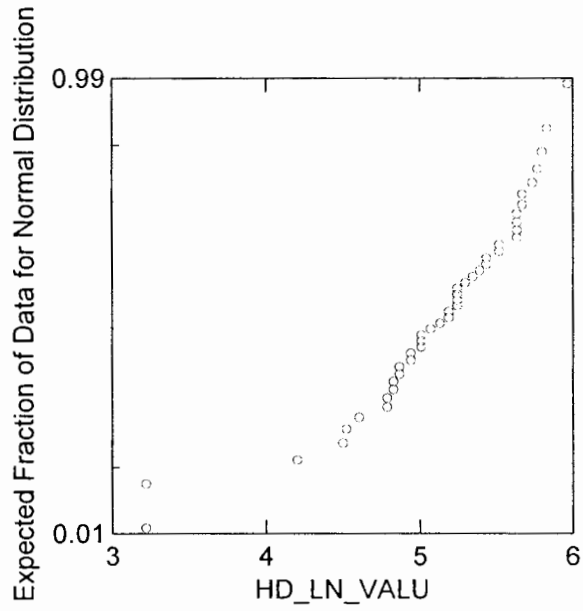


The following results are for:

WELL\$ = MW-4

Data for the following results were selected according to:

(PARAM_ID\$ = "TCE")

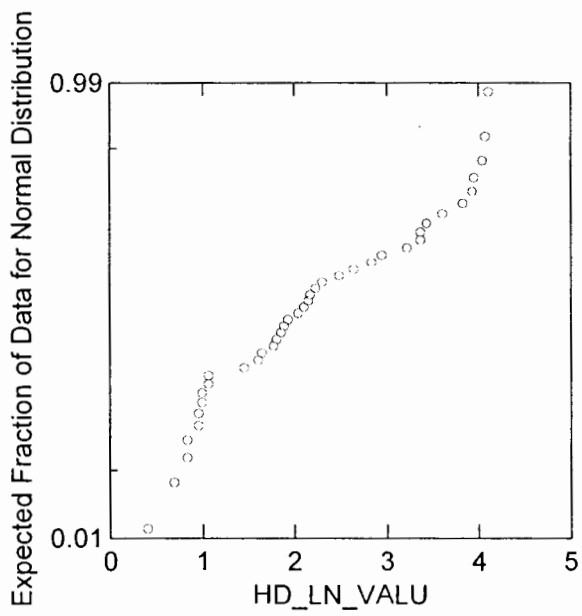


The following results are for:

WELL\$ = MW-6B

Data for the following results were selected according to:

(PARAM_ID\$="TCE")

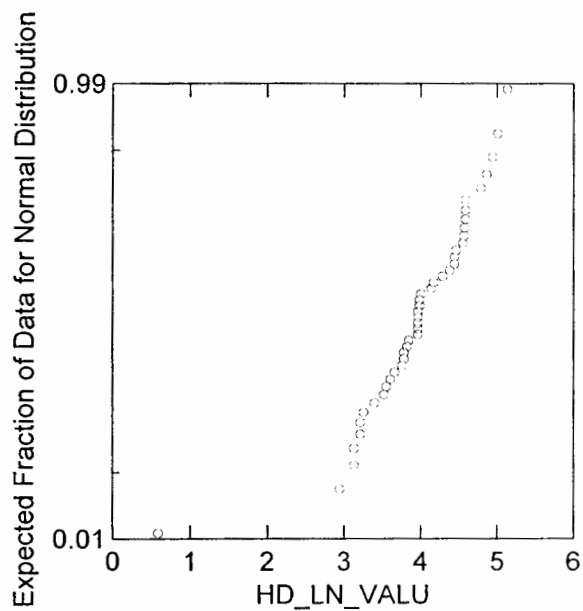


The following results are for:

WELL\$ = MW-7

Data for the following results were selected according to:

(PARAM_ID\$= "TCE")

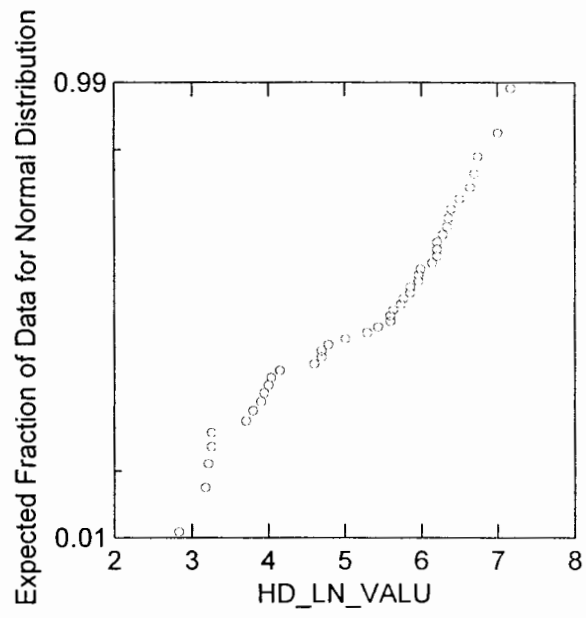


The following results are for:

WELL\$ = MW-9

Data for the following results were selected according to:

(PARAM_ID\$= "TCE")



Appendix E-4
Test of Variance – Box Plots

IMPORT successfully completed.

IMPORT successfully completed.

SYSTAT Rectangular file O:\2279-111\Oct99\scs.SYD,
created Sat Dec 11, 1999 at 13:51:28, contains variables:

TYPE\$	WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE
HD_LN_VALU	VAL_FLAG\$	DATE\$	DATE_NO		

The following results are for:

PARAM_ID\$ = TCE

Data for the following results were selected according to:
(PARAM_ID\$= "TCE")

408 cases and 10 variables processed.

The following results are for:

PARAM_ID\$ = TCE

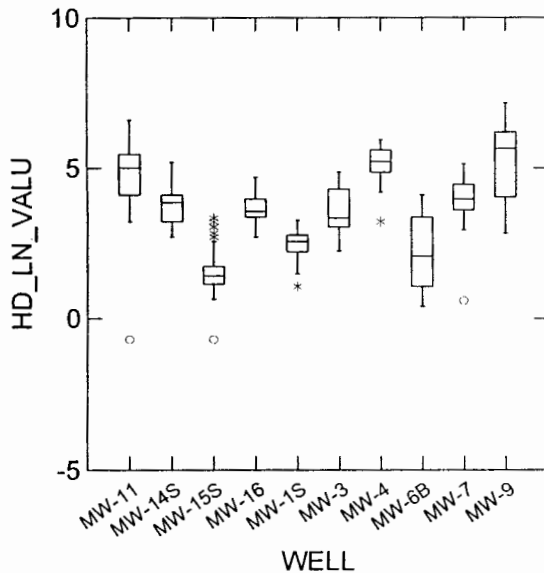
Data for the following results were selected according to:
(PARAM_ID\$= "TCE")

408 cases and 10 variables processed.

The following results are for:

WELL\$ = MW-11

Data for the following results were selected according to:
(PARAM_ID\$= "TCE")



IMPORT successfully completed.

IMPORT successfully completed.

SYSTAT Rectangular file O:\2279-111\Oct99\scc.SYD,
created Sat Dec 11, 1999 at 13:51:28, contains variables:

TYPE\$	WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE
HD_LN_VALU	VAL_FLAG\$	DATE\$	DATE_NO		

The following results are for:

PARAM_ID\$ = TCE

Data for the following results were selected according to:

(PARAM_ID\$= "TCE")

408 cases and 10 variables processed.

The following results are for:

PARAM_ID\$ = TCE

Data for the following results were selected according to:

(PARAM_ID\$= "TCE")

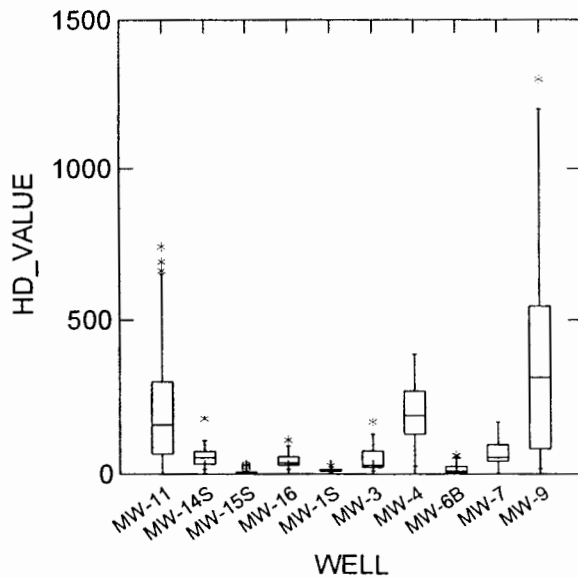
408 cases and 10 variables processed.

The following results are for:

WELL\$ = MW-11

Data for the following results were selected according to:

(PARAM_ID\$= "TCE")



Appendix E-5
Nonparametric ANOVA Results



IMPORT successfully completed.

790 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\1-11.SYD,
created Sat Dec 11, 1999 at 13:35:36, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
IMPORT successfully completed.					

790 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Oct99\1-11.SYD,
created Sat Dec 11, 1999 at 13:37:36, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
IMPORT successfully completed.					

718 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Oct99\1-14s.SYD,
created Sat Dec 11, 1999 at 13:38:28, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
IMPORT successfully completed.					

727 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Oct99\1-15s.SYD,
created Sat Dec 11, 1999 at 13:38:54, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
IMPORT successfully completed.					

673 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Oct99\1-16.SYD,

created Sat Dec 11, 1999 at 13:39:14, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
IMPORT successfully completed.					

790 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Oct99\1-3.SYD,
created Sat Dec 11, 1999 at 13:39:34, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
IMPORT successfully completed.					

790 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Oct99\1-4.SYD,
created Sat Dec 11, 1999 at 13:40:00, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
IMPORT successfully completed.					

754 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Oct99\1-6B.SYD,
created Sat Dec 11, 1999 at 13:40:26, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
IMPORT successfully completed.					

790 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Oct99\1-7.SYD,
created Sat Dec 11, 1999 at 13:40:44, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
IMPORT successfully completed.					

790 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Oct99\1-9.SYD,
created Sat Dec 11, 1999 at 13:41:12, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
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SYSTAT Rectangular file O:\2279-111\Oct99\1-11.syd,
created Sat Dec 11, 1999 at 13:37:36, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
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The following results are for:

PARAM_ID\$ = BEN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-11	44	2303.500
-------	----	----------

MW-1S	44	1612.500
-------	----	----------

Mann-Whitney U test statistic = 1313.500

Probability is 0.002

Chi-square approximation = 10.060 with 1 df

The following results are for:

PARAM_ID\$ = CD

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-11	44	1917.000
-------	----	----------

MW-1S	44	1999.000
-------	----	----------

Mann-Whitney U test statistic = 927.000

Probability is 0.627

Chi-square approximation = 0.236 with 1 df

The following results are for:

PARAM_ID\$ = CU

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-11	44	1994.000
MW-1S	44	1922.000

Mann-Whitney U test statistic = 1004.000
 Probability is 0.725
 Chi-square approximation = 0.124 with 1 df

The following results are for:

PARAM_ID\$ = EBN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-11	44	2850.500
MW-1S	44	1065.500

Mann-Whitney U test statistic = 1860.500
 Probability is 0.000
 Chi-square approximation = 57.328 with 1 df

The following results are for:

PARAM_ID\$ = HCR

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-11	44	1941.500
MW-1S	44	1974.500

Mann-Whitney U test statistic = 951.500
 Probability is 0.841
 Chi-square approximation = 0.040 with 1 df

The following results are for:

PARAM_ID\$ = TCE

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-11	44	2838.000

MW-1S 44 1078.000
 Mann-Whitney U test statistic = 1848.000
 Probability is 0.000
 Chi-square approximation = 53.961 with 1 df

The following results are for:
 PARAM_ID\$ = TCR

Categorical values encountered during processing are:
 WELL\$ (2 levels)
 MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 88 cases
 Dependent variable is VALUE
 Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-11	44	1973.000
MW-1S	44	1943.000

Mann-Whitney U test statistic = 983.000
 Probability is 0.862
 Chi-square approximation = 0.030 with 1 df

The following results are for:
 PARAM_ID\$ = TOL

Categorical values encountered during processing are:
 WELL\$ (2 levels)
 MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
 Dependent variable is VALUE
 Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-11	43	2527.500
MW-1S	43	1213.500

Mann-Whitney U test statistic = 1581.500
 Probability is 0.000
 Chi-square approximation = 35.533 with 1 df

The following results are for:
 PARAM_ID\$ = TX

Categorical values encountered during processing are:
 WELL\$ (2 levels)
 MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 88 cases
 Dependent variable is VALUE
 Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-11	44	2638.500
MW-1S	44	1277.500

Mann-Whitney U test statistic = 1648.500
 Probability is 0.000
 Chi-square approximation = 33.217 with 1 df

SYSTAT Rectangular file O:\2279-111\Oct99\1-14s.syd,
created Sat Dec 11, 1999 at 13:38:28, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
--------	------------	-------	----------	----------	------------

The following results are for:

PARAM_ID\$ = BEN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 80 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-14S	36	1713.500
MW-1S	44	1526.500

Mann-Whitney U test statistic = 1047.500
Probability is 0.003
Chi-square approximation = 8.826 with 1 df

The following results are for:

PARAM_ID\$ = CD

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 80 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-14S	36	1497.500
MW-1S	44	1742.500

Mann-Whitney U test statistic = 831.500
Probability is 0.564
Chi-square approximation = 0.333 with 1 df

The following results are for:

PARAM_ID\$ = CU

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 80 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-14S	36	1736.000
MW-1S	44	1504.000

2. **Figure 1**

Conclusion

Figure 1

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Abstract

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Figure 1

1999

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Abstract

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Subject

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100

100

1999

Figure 1

Figure 1

1

10

PARAM_ID\$ = TCR

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 80 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-14S	36	2059.000
--------	----	----------

MW-1S	44	1181.000
-------	----	----------

Mann-Whitney U test statistic = 1393.000

Probability is 0.000

Chi-square approximation = 40.528 with 1 df

The following results are for:

PARAM_ID\$ = TOL

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 78 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-14S	35	1630.500
--------	----	----------

MW-1S	43	1450.500
-------	----	----------

Mann-Whitney U test statistic = 1000.500

Probability is 0.003

Chi-square approximation = 9.047 with 1 df

The following results are for:

PARAM_ID\$ = TX

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 80 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-14S	36	1757.000
--------	----	----------

MW-1S	44	1483.000
-------	----	----------

Mann-Whitney U test statistic = 1091.000

Probability is 0.002

Chi-square approximation = 9.203 with 1 df

SYSTAT Rectangular file O:\2279-111\Oct99\1-15s.syd,
created Sat Dec 11, 1999 at 13:38:54, contains variables:

10

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1

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1999

Figure 1

1

10

Page

1

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1992

PARAM_ID\$ = EBN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 81 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-15S	37	1843.500
MW-1S	44	1477.500

Mann-Whitney U test statistic = 1140.500
 Probability is 0.001
 Chi-square approximation = 10.792 with 1 df

The following results are for:

PARAM_ID\$ = HCR

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 81 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-15S	37	1498.500
MW-1S	44	1822.500

Mann-Whitney U test statistic = 795.500
 Probability is 0.805
 Chi-square approximation = 0.061 with 1 df

The following results are for:

PARAM_ID\$ = TCE

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 81 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-15S	37	961.500
MW-1S	44	2359.500

Mann-Whitney U test statistic = 258.500
 Probability is 0.000
 Chi-square approximation = 27.764 with 1 df

The following results are for:

PARAM_ID\$ = TCR

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 81 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-15S	37	1686.000
--------	----	----------

MW-1S	44	1635.000
-------	----	----------

Mann-Whitney U test statistic = 983.000

Probability is 0.034

Chi-square approximation = 4.482 with 1 df

The following results are for:

PARAM_ID\$ = TOL

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 79 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-15S	36	1606.000
--------	----	----------

MW-1S	43	1554.000
-------	----	----------

Mann-Whitney U test statistic = 940.000

Probability is 0.048

Chi-square approximation = 3.926 with 1 df

The following results are for:

PARAM_ID\$ = TX

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 81 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-15S	37	1685.000
--------	----	----------

MW-1S	44	1636.000
-------	----	----------

Mann-Whitney U test statistic = 982.000

Probability is 0.094

Chi-square approximation = 2.805 with 1 df

SYSTAT Rectangular file O:\2279-111\Oct99\1-16.syd,

created Sat Dec 11, 1999 at 13:39:14, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
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The following results are for:

PARAM_ID\$ = BEN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-16, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 75 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-16	31	1514.500
MW-1S	44	1335.500

Mann-Whitney U test statistic = 1018.500
 Probability is 0.000
 Chi-square approximation = 17.788 with 1 df

The following results are for:

PARAM_ID\$ = CD

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-16, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 75 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-16	31	1170.000
MW-1S	44	1680.000

Mann-Whitney U test statistic = 674.000
 Probability is 0.879
 Chi-square approximation = 0.023 with 1 df

The following results are for:

PARAM_ID\$ = CU

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-16, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 75 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-16	31	1178.000
MW-1S	44	1672.000

Mann-Whitney U test statistic = 682.000
 Probability is 1.000
 Chi-square approximation = 0.000 with 1 df

The following results are for:

PARAM_ID\$ = EBN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-16, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 75 cases
 Dependent variable is VALUE
 Grouping variable is WELL\$

Group	Count	Rank Sum
MW-16	31	1739.500
MW-1S	44	1110.500

Mann-Whitney U test statistic = 1243.500
 Probability is 0.000
 Chi-square approximation = 38.997 with 1 df

The following results are for:
 PARAM_ID\$ = HCR

Categorical values encountered during processing are:
 WELL\$ (2 levels)
 MW-16, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 75 cases
 Dependent variable is VALUE
 Grouping variable is WELL\$

Group	Count	Rank Sum
MW-16	31	1103.000
MW-1S	44	1747.000

Mann-Whitney U test statistic = 607.000
 Probability is 0.235
 Chi-square approximation = 1.413 with 1 df

The following results are for:
 PARAM_ID\$ = TCE

Categorical values encountered during processing are:
 WELL\$ (2 levels)
 MW-16, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 75 cases
 Dependent variable is VALUE
 Grouping variable is WELL\$

Group	Count	Rank Sum
MW-16	31	1837.500
MW-1S	44	1012.500

Mann-Whitney U test statistic = 1341.500
 Probability is 0.000
 Chi-square approximation = 50.392 with 1 df

The following results are for:
 PARAM_ID\$ = TCR

Categorical values encountered during processing are:
 WELL\$ (2 levels)
 MW-16, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 75 cases
 Dependent variable is VALUE
 Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-16 31 1157.000
 MW-1S 44 1693.000
 Mann-Whitney U test statistic = 661.000
 Probability is 0.673
 Chi-square approximation = 0.178 with 1 df

The following results are for:

PARAM_ID\$ = TOL

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-16, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 73 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-16	30	1482.500
MW-1S	43	1218.500

Mann-Whitney U test statistic = 1017.500
 Probability is 0.000
 Chi-square approximation = 21.932 with 1 df

The following results are for:

PARAM_ID\$ = TX

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-16, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 75 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-16	31	1577.000
MW-1S	44	1273.000

Mann-Whitney U test statistic = 1081.000
 Probability is 0.000
 Chi-square approximation = 19.357 with 1 df

SYSTAT Rectangular file O:\2279-111\Oct99\1-3.syd,
 created Sat Dec 11, 1999 at 13:39:34, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
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The following results are for:

PARAM_ID\$ = BEN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-3

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	44	1730.500
-------	----	----------

MW-3	44	2185.500
------	----	----------

Mann-Whitney U test statistic = 740.500

Probability is 0.017

Chi-square approximation = 5.698 with 1 df

The following results are for:

PARAM_ID\$ = CD

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-3

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	44	1958.000
-------	----	----------

MW-3	44	1958.000
------	----	----------

Mann-Whitney U test statistic = 968.000

Probability is 1.000

Chi-square approximation = 0.000 with 1 df

The following results are for:

PARAM_ID\$ = CU

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-3

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	44	2026.500
-------	----	----------

MW-3	44	1889.500
------	----	----------

Mann-Whitney U test statistic = 1036.500

Probability is 0.452

Chi-square approximation = 0.565 with 1 df

The following results are for:

PARAM_ID\$ = EBN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-3

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S 44 1564.000
 MW-3 44 2352.000
 Mann-Whitney U test statistic = 574.000
 Probability is 0.000
 Chi-square approximation = 12.245 with 1 df

The following results are for:

PARAM_ID\$ = HCR

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-3

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	44	1937.500
MW-3	44	1978.500

Mann-Whitney U test statistic = 947.500
 Probability is 0.812
 Chi-square approximation = 0.057 with 1 df

The following results are for:

PARAM_ID\$ = TCE

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-3

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	44	1162.000
MW-3	44	2754.000

Mann-Whitney U test statistic = 172.000
 Probability is 0.000
 Chi-square approximation = 44.172 with 1 df

The following results are for:

PARAM_ID\$ = TCR

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-3

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	44	1916.500
MW-3	44	1999.500

Mann-Whitney U test statistic = 926.500
 Probability is 0.586
 Chi-square approximation = 0.296 with 1 df

The following results are for:

PARAM_ID\$ = TOL

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-3

Kruskal-Wallis One-Way Analysis of Variance for 86 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	43	1564.000
MW-3	43	2177.000

Mann-Whitney U test statistic = 618.000
 Probability is 0.001
 Chi-square approximation = 10.614 with 1 df

The following results are for:

PARAM_ID\$ = TX

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-3

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	44	1695.000
MW-3	44	2221.000

Mann-Whitney U test statistic = 705.000
 Probability is 0.020
 Chi-square approximation = 5.407 with 1 df

SYSTAT Rectangular file O:\2279-111\Oct99\1-4.syd,
 created Sat Dec 11, 1999 at 13:40:00, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
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The following results are for:

PARAM_ID\$ = BEN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-4

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	44	1268.500

MW-4 44 2647.500
 Mann-Whitney U test statistic = 278.500
 Probability is 0.000
 Chi-square approximation = 38.275 with 1 df

The following results are for:

PARAM_ID\$ = CD

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-4

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	44	1013.000
MW-4	44	2903.000

Mann-Whitney U test statistic = 23.000
 Probability is 0.000
 Chi-square approximation = 67.202 with 1 df

The following results are for:

PARAM_ID\$ = CU

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-4

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	44	1834.000
MW-4	44	2082.000

Mann-Whitney U test statistic = 844.000
 Probability is 0.225
 Chi-square approximation = 1.471 with 1 df

The following results are for:

PARAM_ID\$ = EBN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-4

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	44	1105.000
MW-4	44	2811.000

Mann-Whitney U test statistic = 115.000
 Probability is 0.000
 Chi-square approximation = 52.771 with 1 df

The following results are for:

PARAM_ID\$ = HCR

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-4

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	44	990.000
-------	----	---------

MW-4	44	2926.000
------	----	----------

Mann-Whitney U test statistic = 0.000

Probability is 0.000

Chi-square approximation = 69.646 with 1 df

The following results are for:

PARAM_ID\$ = TCE

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-4

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	44	991.000
-------	----	---------

MW-4	44	2925.000
------	----	----------

Mann-Whitney U test statistic = 1.000

Probability is 0.000

Chi-square approximation = 65.176 with 1 df

The following results are for:

PARAM_ID\$ = TCR

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-4

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	44	990.000
-------	----	---------

MW-4	44	2926.000
------	----	----------

Mann-Whitney U test statistic = 0.000

Probability is 0.000

Chi-square approximation = 70.970 with 1 df

The following results are for:

PARAM_ID\$ = TOL

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-4

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
 Dependent variable is VALUE
 Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	43	1131.500
MW-4	43	2609.500

Mann-Whitney U test statistic = 185.500
 Probability is 0.000
 Chi-square approximation = 45.754 with 1 df

The following results are for:
 PARAM_ID\$ = TX

Categorical values encountered during processing are:
 WELL\$ (2 levels)
 MW-1S, MW-4

Kruskal-Wallis One-Way Analysis of Variance for 88 cases
 Dependent variable is VALUE
 Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	44	1062.500
MW-4	44	2853.500

Mann-Whitney U test statistic = 72.500
 Probability is 0.000
 Chi-square approximation = 57.335 with 1 df

SYSTAT Rectangular file O:\2279-111\Oct99\1-6B.syd,
 created Sat Dec 11, 1999 at 13:40:26, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
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The following results are for:
 PARAM_ID\$ = BEN

Categorical values encountered during processing are:
 WELL\$ (2 levels)
 MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 84 cases
 Dependent variable is VALUE
 Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	44	1831.000
MW-6B	40	1739.000

Mann-Whitney U test statistic = 841.000
 Probability is 0.633
 Chi-square approximation = 0.228 with 1 df

The following results are for:

PARAM_ID\$ = CD

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 84 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	44	1826.000
MW-6B	40	1744.000

Mann-Whitney U test statistic = 836.000

Probability is 0.543

Chi-square approximation = 0.370 with 1 df

The following results are for:

PARAM_ID\$ = CU

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 84 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	44	1966.500
MW-6B	40	1603.500

Mann-Whitney U test statistic = 976.500

Probability is 0.247

Chi-square approximation = 1.340 with 1 df

The following results are for:

PARAM_ID\$ = EBN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 84 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	44	1631.000
MW-6B	40	1939.000

Mann-Whitney U test statistic = 641.000

Probability is 0.021

Chi-square approximation = 5.294 with 1 df

The following results are for:

PARAM_ID\$ = HCR

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 84 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	44	1927.500
-------	----	----------

MW-6B	40	1642.500
-------	----	----------

Mann-Whitney U test statistic = 937.500

Probability is 0.462

Chi-square approximation = 0.540 with 1 df

The following results are for:

PARAM_ID\$ = TCE

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 84 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	44	2031.500
-------	----	----------

MW-6B	40	1538.500
-------	----	----------

Mann-Whitney U test statistic = 1041.500

Probability is 0.148

Chi-square approximation = 2.094 with 1 df

The following results are for:

PARAM_ID\$ = TCR

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 84 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	44	1688.000
-------	----	----------

MW-6B	40	1882.000
-------	----	----------

Mann-Whitney U test statistic = 698.000

Probability is 0.026

Chi-square approximation = 4.954 with 1 df

The following results are for:

PARAM_ID\$ = TOL

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 82 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	43	1577.500
-------	----	----------

MW-6B	39	1825.500
-------	----	----------

Mann-Whitney U test statistic = 631.500

Probability is 0.027

Chi-square approximation = 4.868 with 1 df

The following results are for:

PARAM_ID\$ = TX

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 84 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	44	1713.000
-------	----	----------

MW-6B	40	1857.000
-------	----	----------

Mann-Whitney U test statistic = 723.000

Probability is 0.131

Chi-square approximation = 2.284 with 1 df

SYSTAT Rectangular file O:\2279-111\Oct99\1-7.syd,
created Sat Dec 11, 1999 at 13:40:44, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
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The following results are for:

PARAM_ID\$ = BEN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	44	1603.000
-------	----	----------

MW-7	44	2313.000
------	----	----------

Mann-Whitney U test statistic = 613.000

Probability is 0.001

Chi-square approximation = 11.849 with 1 df

The following results are for:

PARAM_ID\$ = CD

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 88 cases
 Dependent variable is VALUE
 Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	44	1899.000
MW-7	44	2017.000

Mann-Whitney U test statistic = 909.000
 Probability is 0.474
 Chi-square approximation = 0.513 with 1 df

The following results are for:
 PARAM_ID\$ = CU

Categorical values encountered during processing are:
 WELL\$ (2 levels)
 MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 88 cases
 Dependent variable is VALUE
 Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	44	1727.000
MW-7	44	2189.000

Mann-Whitney U test statistic = 737.000
 Probability is 0.029
 Chi-square approximation = 4.756 with 1 df

The following results are for:
 PARAM_ID\$ = EBN

Categorical values encountered during processing are:
 WELL\$ (2 levels)
 MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 88 cases
 Dependent variable is VALUE
 Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	44	1582.000
MW-7	44	2334.000

Mann-Whitney U test statistic = 592.000
 Probability is 0.001
 Chi-square approximation = 11.257 with 1 df

The following results are for:
 PARAM_ID\$ = HCR

Categorical values encountered during processing are:
 WELL\$ (2 levels)
 MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 88 cases
 Dependent variable is VALUE
 Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	44	1973.500
MW-7	44	1942.500
Mann-Whitney U test statistic =		983.500
Probability is	0.857	
Chi-square approximation =		0.032 with 1 df

The following results are for:

PARAM_ID\$ = TCE

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	44	1043.000
-------	----	----------

MW-7	44	2873.000
------	----	----------

Mann-Whitney U test statistic = 53.000

Probability is 0.000

Chi-square approximation = 58.350 with 1 df

The following results are for:

PARAM_ID\$ = TCR

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	44	1856.500
-------	----	----------

MW-7	44	2059.500
------	----	----------

Mann-Whitney U test statistic = 866.500

Probability is 0.219

Chi-square approximation = 1.511 with 1 df

The following results are for:

PARAM_ID\$ = TOL

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 86 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	43	1602.500
-------	----	----------

MW-7	43	2138.500
------	----	----------

Mann-Whitney U test statistic = 656.500

Probability is 0.004

Chi-square approximation = 8.333 with 1 df

The following results are for:

PARAM_ID\$ = TX

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	44	1806.500
-------	----	----------

MW-7	44	2109.500
------	----	----------

Mann-Whitney U test statistic = 816.500

Probability is 0.174

Chi-square approximation = 1.846 with 1 df

SYSTAT Rectangular file O:\2279-111\Oct99\1-9.syd,
created Sat Dec 11, 1999 at 13:41:12, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
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The following results are for:

PARAM_ID\$ = BEN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	44	1299.500
-------	----	----------

MW-9	44	2616.500
------	----	----------

Mann-Whitney U test statistic = 309.500

Probability is 0.000

Chi-square approximation = 34.223 with 1 df

The following results are for:

PARAM_ID\$ = CD

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S 44 1919.500
 MW-9 44 1996.500
 Mann-Whitney U test statistic = 929.500
 Probability is 0.632
 Chi-square approximation = 0.229 with 1 df

The following results are for:
 PARAM_ID\$ = CU

Categorical values encountered during processing are:
 WELL\$ (2 levels)
 MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 88 cases
 Dependent variable is VALUE
 Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	44	2038.000
MW-9	44	1878.000

Mann-Whitney U test statistic = 1048.000
 Probability is 0.387
 Chi-square approximation = 0.747 with 1 df

The following results are for:
 PARAM_ID\$ = EBN

Categorical values encountered during processing are:
 WELL\$ (2 levels)
 MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 88 cases
 Dependent variable is VALUE
 Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	44	1211.500
MW-9	44	2704.500

Mann-Whitney U test statistic = 221.500
 Probability is 0.000
 Chi-square approximation = 40.781 with 1 df

The following results are for:
 PARAM_ID\$ = HCR

Categorical values encountered during processing are:
 WELL\$ (2 levels)
 MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 88 cases
 Dependent variable is VALUE
 Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	44	1735.000
MW-9	44	2181.000

Mann-Whitney U test statistic = 745.000
 Probability is 0.021
 Chi-square approximation = 5.332 with 1 df

The following results are for:

PARAM_ID\$ = TCE

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	44	999.500
MW-9	44	2916.500

Mann-Whitney U test statistic = 9.500
 Probability is 0.000
 Chi-square approximation = 64.018 with 1 df

The following results are for:

PARAM_ID\$ = TCR

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	44	1669.000
MW-9	44	2247.000

Mann-Whitney U test statistic = 679.000
 Probability is 0.002
 Chi-square approximation = 9.453 with 1 df

The following results are for:

PARAM_ID\$ = TOL

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 86 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	43	1195.500
MW-9	43	2545.500

Mann-Whitney U test statistic = 249.500
 Probability is 0.000
 Chi-square approximation = 38.483 with 1 df

The following results are for:

PARAM_ID\$ = TX

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	44	1259.500
-------	----	----------

MW-9	44	2656.500
------	----	----------

Mann-Whitney U test statistic = 269.500

Probability is 0.000

Chi-square approximation = 35.712 with 1 df

Appendix E-6
Parametric ANOVA Results

IMPORT successfully completed.

IMPORT successfully completed.

790 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Oct99\1-11.SYD,
created Sat Dec 11, 1999 at 13:49:04, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
--------	------------	-------	----------	----------	------------

Data for the following results were selected according to:
(PARAM_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:
WELL\$ (2 levels)
MW-11, MW-1S

Dep Var: HD_VALUE N: 88 Multiple R: 0.584 Squared multiple R: 0.341

Estimates of effects $B = (X'X)^{-1} X'Y$

	HD_VALUE
CONSTANT	114.591
WELL\$ MW-11	102.227

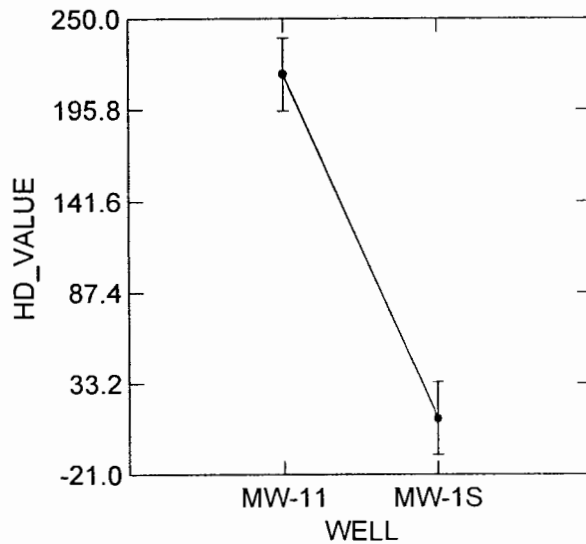
Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	919636.545	1	919636.545	44.537	0.000
Error	1775812.467	86	20648.982		

Least squares means.

		LS Mean	SE	N
WELL\$	=MW-11	216.818	21.663	44
WELL\$	=MW-1S	12.364	21.663	44

Least Squares Means



*** WARNING ***

Case 729 is an outlier (Studentized Residual = 3.548)
Case 765 is an outlier (Studentized Residual = 3.990)

Durbin-Watson D Statistic 1.496

First Order Autocorrelation 0.239

COL/

ROW WELLS

1 MW-11

2 MW-1S

Using least squares means.

Post Hoc test of HD_VALUE

Using model MSE of 20648.982 with 86 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	-204.455	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Data for the following results were selected according to:

(PARAM_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-11, MW-1S

2 case(s) deleted due to missing data.

Dep Var: HD_LN_VALU N: 86 Multiple R: 0.707 Squared multiple R: 0.499

$$\text{Estimates of effects } B = (X'X)^{-1} X'Y$$

HD_LN_VALU

CONSTANT 3.559

WELL\$ MW-11 1.104

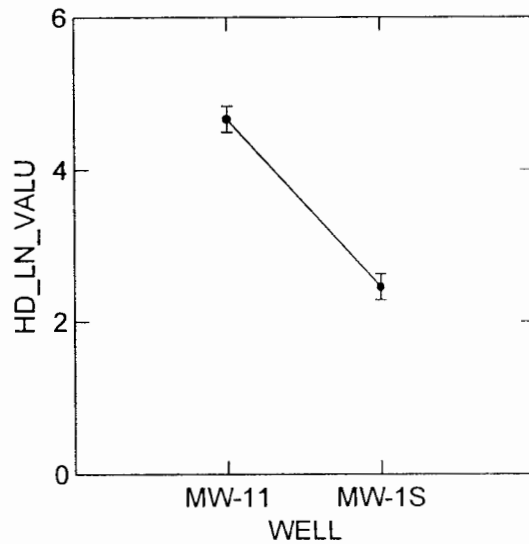
Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	104.838	1	104.838	83.744	0.000
Error	105.159	84	1.252		

Least squares means.

		LS Mean	SE	N
WELL\$	=MW-11	4.663	0.171	43
WELL\$	=MW-1S	2.455	0.171	43

Least Squares Means



*** WARNING ***

Case 121 is an outlier (Studentized Residual = -5.671)
 Case 122 is an outlier (Studentized Residual = -5.671)

Durbin-Watson D Statistic 0.929

First Order Autocorrelation 0.399

COL/

ROW WELLS

1 MW-11

2 MW-1S

Using least squares means.

Post Hoc test of HD_LN_VALU

Using model MSE of 1.252 with 84 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	-2.208	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

IMPORT successfully completed.

718 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Oct99\1-14s.SYD,
created Sat Dec 11, 1999 at 13:49:10, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
--------	------------	-------	----------	----------	------------

Data for the following results were selected according to:
(PARAM_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)
MW-14S, MW-1S

Dep Var: HD_VALUE N: 80 Multiple R: 0.660 Squared multiple R: 0.436

Estimates of effects $B = (X'X)^{-1} X'Y$

	HD_VALUE
CONSTANT	35.126
WELL\$ MW-14S	22.763

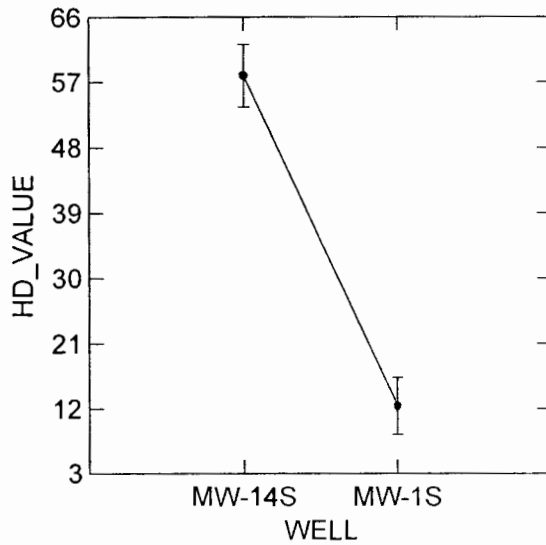
Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	41036.463	1	41036.463	60.202	0.000
Error	53167.977	78	681.641		

Least squares means.

		LS Mean	SE	N
WELL\$	=MW-14S	57.889	4.351	36
WELL\$	=MW-1S	12.364	3.936	44

Least Squares Means



*** WARNING ***

Case 102 is an outlier (Studentized Residual = 5.587)
 Case 711 is an outlier (Studentized Residual = 5.587)

Durbin-Watson D Statistic 1.425

First Order Autocorrelation 0.270

COL/

ROW WELLS

1 MW-14S

2 MW-1S

Using least squares means.

Post Hoc test of HD_VALUE

Using model MSE of 681.641 with 78 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	-45.525	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Data for the following results were selected according to:

(PARAM_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-14S, MW-1S

2 case(s) deleted due to missing data.

Dep Var: HD_LN_VALU N: 78 Multiple R: 0.791 Squared multiple R: 0.625

$$\text{Estimates of effects } B = (X'X)^{-1} X'Y$$

HD_LN_VALU

CONSTANT	3.132
WELL\$ MW-14S	0.677

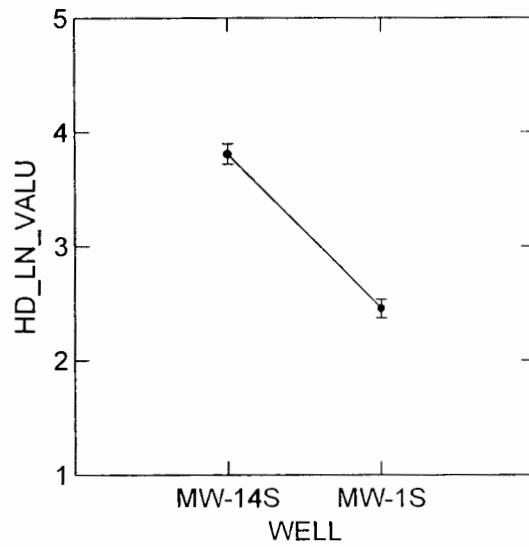
Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	35.386	1	35.386	126.634	0.000
Error	21.237	76	0.279		

Least squares means.

		LS Mean	SE	N
WELL\$	=MW-14S	3.809	0.089	35
WELL\$	=MW-1S	2.455	0.081	43

Least Squares Means



Durbin-Watson D Statistic 1.212
 First Order Autocorrelation 0.364
 COL/

ROW WELL\$
 1 MW-14S
 2 MW-1S

Using least squares means.
 Post Hoc test of HD_LN_VALU

Using model MSE of 0.279 with 76 df.
 Matrix of pairwise mean differences:

	1	2
1	0.000	
2	-1.354	0.000

Tukey HSD Multiple Comparisons.
 Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

IMPORT successfully completed.

727 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Oct99\1-15s.SYD,
created Sat Dec 11, 1999 at 13:49:14, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
--------	------------	-------	----------	----------	------------

Data for the following results were selected according to:
(PARAM_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)
MW-15S, MW-1S

Dep Var: HD_VALUE N: 81 Multiple R: 0.492 Squared multiple R: 0.242

Estimates of effects $B = (X'X)^{-1} X'Y$

	HD_VALUE
CONSTANT	9.322
WELL\$ MW-15S	-3.041

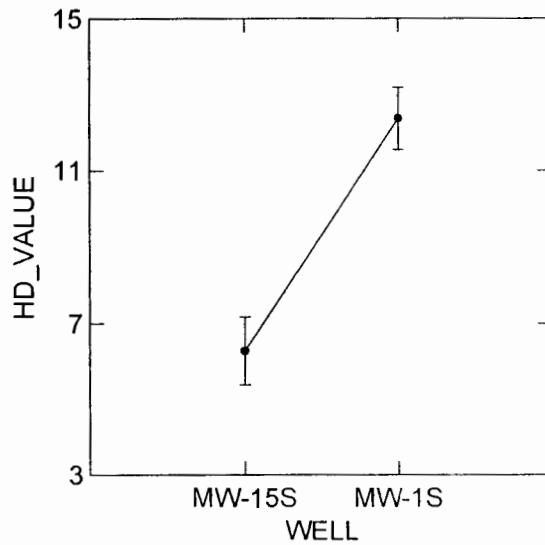
Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	743.604	1	743.604	25.275	0.000
Error	2324.219	79	29.420		

Least squares means.

	LS Mean	SE	N
WELL\$ =MW-15S	6.281	0.892	37
WELL\$ =MW-1S	12.364	0.818	44

Least Squares Means



*** WARNING ***

Case 102 is an outlier (Studentized Residual = 4.534)

Durbin-Watson D Statistic 0.843

First Order Autocorrelation 0.569

COL/

ROW WELLS

1 MW-15S

2 MW-1S

Using least squares means.

Post Hoc test of HD_VALUE

Using model MSE of 29.420 with 79 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	6.083	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Data for the following results were selected according to:
(PARAM_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-15S, MW-1S

2 case(s) deleted due to missing data.

Dep Var: HD_LN_VALU N: 79 Multiple R: 0.560 Squared multiple R: 0.313

Estimates of effects $B = (X'X)^{-1} X'Y$

	HD_LN_VALU
CONSTANT	2.022
WELL\$ MW-15S	-0.432

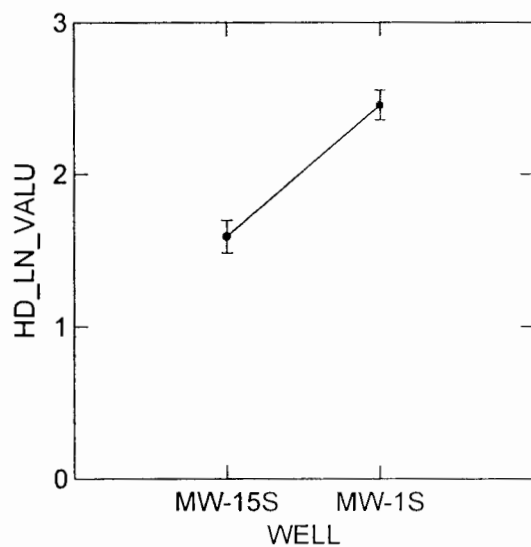
Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	14.637	1	14.637	35.129	0.000
Error	32.083	77	0.417		

Least squares means.

		LS Mean	SE	N
WELL\$	=MW-15S	1.590	0.108	36
WELL\$	=MW-1S	2.455	0.098	43

Least Squares Means



*** WARNING ***

Case 86 is an outlier (Studentized Residual = -3.906)

Durbin-Watson D Statistic 0.681

First Order Autocorrelation 0.577

COL/

ROW WELLS

1 MW-15S

2 MW-1S

Using least squares means.

Post Hoc test of HD_LN_VALU

Using model MSE of 0.417 with 77 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	0.864	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

IMPORT successfully completed.

673 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Oct99\1-16.SYD,
created Sat Dec 11, 1999 at 13:49:20, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
--------	------------	-------	----------	----------	------------

Data for the following results were selected according to:
(PARAM_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-16, MW-1S

Dep Var: HD_VALUE N: 75 Multiple R: 0.732 Squared multiple R: 0.537

Estimates of effects $B = (X'X)^{-1} X'Y$

		HD_VALUE
CONSTANT		28.375
WELL\$	MW-16	16.012

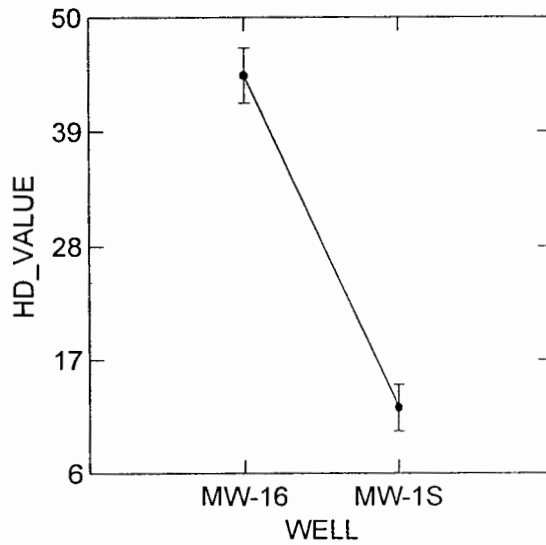
Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	18650.463	1	18650.463	84.513	0.000
Error	16109.777	73	220.682		

Least squares means.

		LS Mean	SE	N
WELL\$	=MW-16	44.387	2.668	31
WELL\$	=MW-1S	12.364	2.240	44

Least Squares Means



*** WARNING ***

Case 66 is an outlier (Studentized Residual = 3.415)
Case 439 is an outlier (Studentized Residual = 5.241)

Durbin-Watson D Statistic 1.372

First Order Autocorrelation 0.287

COL/

ROW WELL\$

1 MW-16

2 MW-1S

Using least squares means.

Post Hoc test of HD_VALUE

Using model MSE of 220.682 with 73 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	-32.023	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Data for the following results were selected according to:

(PARAM_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-16, MW-1S

2 case(s) deleted due to missing data.

Dep Var: HD_LN_VALU N: 73 Multiple R: 0.781 Squared multiple R: 0.610

$$\text{Estimates of effects } B = (X'X)^{-1} X'Y$$

HD_LN_VALU

CONSTANT		3.053
WELL\$	MW-16	0.598

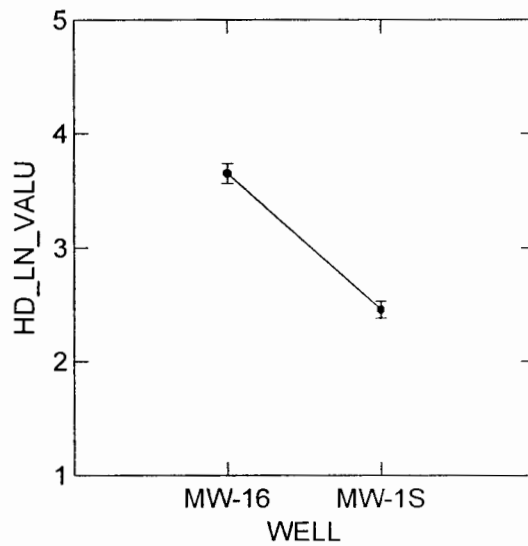
Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	25.316	1	25.316	110.866	0.000
Error	16.213	71	0.228		

Least squares means.

		LS Mean	SE	N
WELL\$	=MW-16	3.651	0.087	30
WELL\$	=MW-1S	2.455	0.073	43

Least Squares Means



Durbin-Watson D Statistic 1.243
 First Order Autocorrelation 0.349
 COL/

ROW WELL\$

1 MW-16
 2 MW-1S

Using least squares means.

Post Hoc test of HD_LN_VALU

Using model MSE of 0.228 with 71 df.
 Matrix of pairwise mean differences:

	1	2
1	0.000	
2	-1.197	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

IMPORT successfully completed.

790 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Oct99\1-3.SYD,
created Sat Dec 11, 1999 at 13:49:24, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
--------	------------	-------	----------	----------	------------

Data for the following results were selected according to:
(PARAM_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:
WELL\$ (2 levels)
MW-1S, MW-3

Dep Var: HD_VALUE N: 88 Multiple R: 0.551 Squared multiple R: 0.304

Estimates of effects $B = (X'X)^{-1} X'Y$

	HD_VALUE
CONSTANT	31.051
WELL\$ MW-1S	-18.687

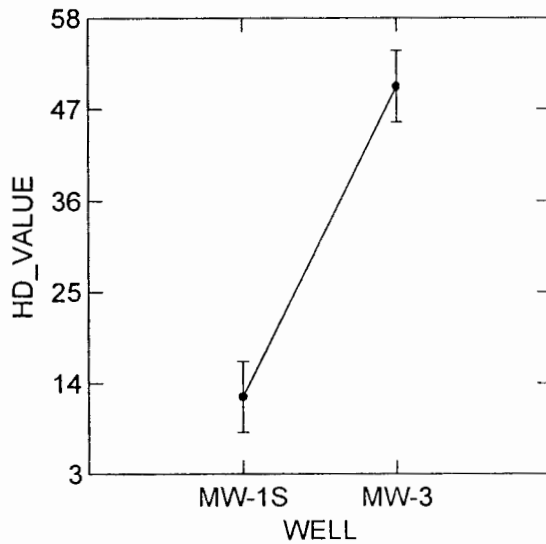
Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	30731.594	1	30731.594	37.490	0.000
Error	70496.666	86	819.729		

Least squares means.

	LS Mean	SE	N
WELL\$ =MW-1S	12.364	4.316	44
WELL\$ =MW-3	49.739	4.316	44

Least Squares Means



*** WARNING ***

Case 784 is an outlier (Studentized Residual = 4.752)

Durbin-Watson D Statistic 0.818

First Order Autocorrelation 0.488

COL/

ROW WELL\$

1 MW-1S

2 MW-3

Using least squares means.

Post Hoc test of HD_VALUE

Using model MSE of 819.729 with 86 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	37.375	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Data for the following results were selected according to:

(PARAM_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-3

2 case(s) deleted due to missing data.

Dep Var: HD_LN_VALU N: 86 Multiple R: 0.665 Squared multiple R: 0.442

Estimates of effects $B = (X'X)^{-1} X'Y$

	HD_LN_VALU	
CONSTANT	3.012	
WELL\$ MW-1S	-0.558	

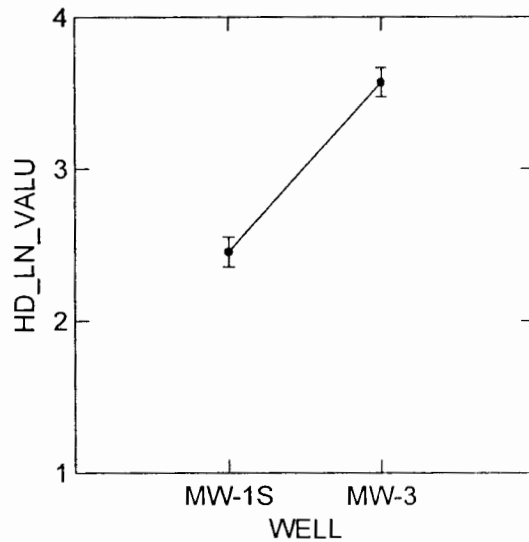
Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	26.741	1	26.741	66.644	0.000
Error	33.705	84	0.401		

Least squares means.

		LS Mean	SE	N
WELL\$	=MW-1S	2.455	0.097	43
WELL\$	=MW-3	3.570	0.097	43

Least Squares Means



Durbin-Watson D Statistic 1.175
First Order Autocorrelation 0.404

COL/

ROW WELL\$

1 MW-1S

2 MW-3

Using least squares means.

Post Hoc test of HD_LN_VALU

Using model MSE of 0.401 with 84 df.
Matrix of pairwise mean differences:

	1	2
1	0.000	
2	1.115	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

IMPORT successfully completed.

790 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Oct99\1-4.SYD,
created Sat Dec 11, 1999 at 13:49:28, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
--------	------------	-------	----------	----------	------------

Data for the following results were selected according to:
(PARAM_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)
MW-1S, MW-4

Dep Var: HD_VALUE N: 88 Multiple R: 0.848 Squared multiple R: 0.719

Estimates of effects $B = (X'X)^{-1} X'Y$

	HD_VALUE
CONSTANT	104.636
WELL\$ MW-1S	-92.273

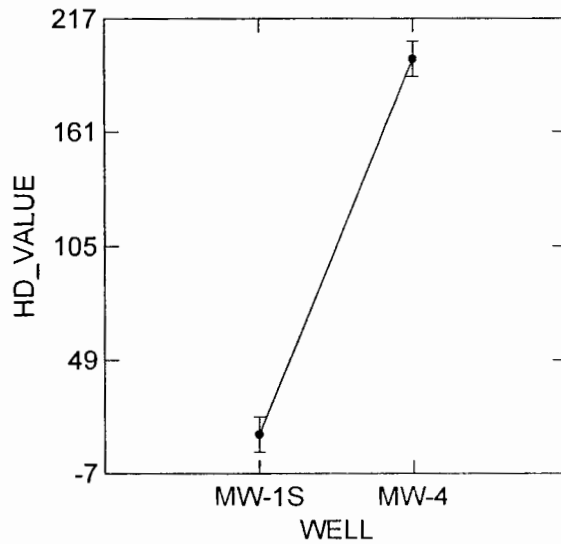
Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	749254.545	1	749254.545	219.750	0.000
Error	293224.058	86	3409.582		

Least squares means.

	LS Mean	SE	N
WELL\$ =MW-1S	12.364	8.803	44
WELL\$ =MW-4	196.909	8.803	44

Least Squares Means



*** WARNING ***

Case 358 is an outlier (Studentized Residual = 3.566)

Durbin-Watson D Statistic 1.086

First Order Autocorrelation 0.457

COL/

ROW WELL\$

1 MW-1S

2 MW-4

Using least squares means.

Post Hoc test of HD_VALUE

Using model MSE of 3409.582 with 86 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	184.545	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Data for the following results were selected according to:
(PARAM_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-4

2 case(s) deleted due to missing data.

Dep Var: HD_LN_VALU N: 86 Multiple R: 0.930 Squared multiple R: 0.865

Estimates of effects $B = (X'X)^{-1} X'Y$

	HD_LN_VALU
CONSTANT	3.796
WELL\$ MW-1S	-1.341

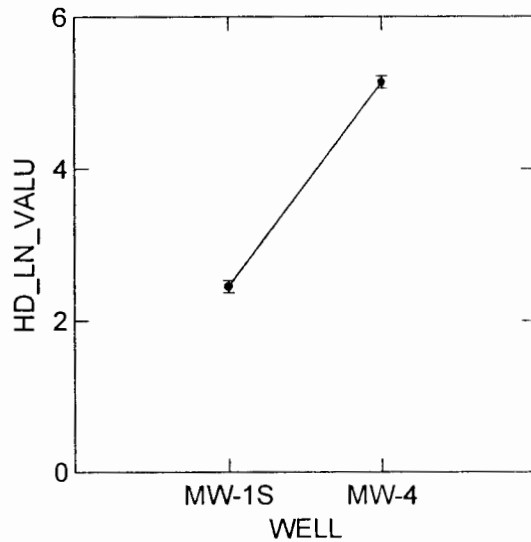
Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	154.687	1	154.687	539.224	0.000
Error	24.097	84	0.287		

Least squares means.

		LS Mean	SE	N
WELL\$	=MW-1S	2.455	0.082	43
WELL\$	=MW-4	5.137	0.082	43

Least Squares Means



*** WARNING ***

Case 336 is an outlier (Studentized Residual = -3.921)
Case 712 is an outlier (Studentized Residual = -3.921)

Durbin-Watson D Statistic 1.547
First Order Autocorrelation 0.215

COL/
ROW WELL\$
1 MW-1S
2 MW-4

Using least squares means.
Post Hoc test of HD_LN_VALU

Using model MSE of 0.287 with 84 df.
Matrix of pairwise mean differences:

	1	2
1	0.000	
2	2.682	0.000

Tukey HSD Multiple Comparisons.
Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

IMPORT successfully completed.

754 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Oct99\1-6B.SYD,
created Sat Dec 11, 1999 at 13:49:34, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
--------	------------	-------	----------	----------	------------

Data for the following results were selected according to:
(PARAM_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)
MW-1S, MW-6B

Dep Var: HD_VALUE N: 84 Multiple R: 0.161 Squared multiple R: 0.026

Estimates of effects $B = (X'X)^{-1} X'Y$

		HD_VALUE
CONSTANT		14.487
WELL\$	MW-1S	-2.123

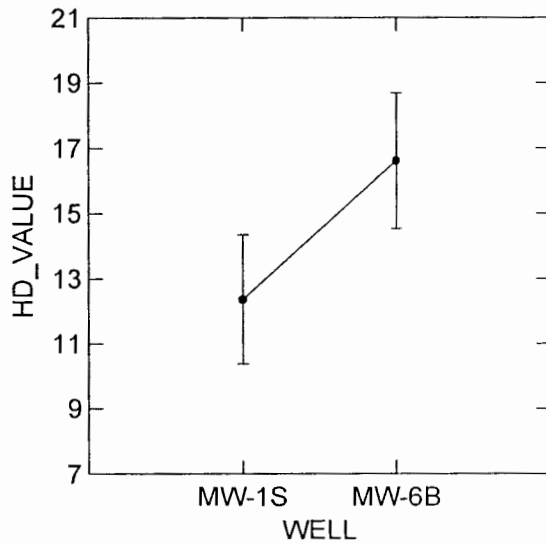
Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	377.805	1	377.805	2.191	0.143
Error	14142.598	82	172.471		

Least squares means.

		LS Mean	SE	N
WELL\$	=MW-1S	12.364	1.980	44
WELL\$	=MW-6B	16.610	2.076	40

Least Squares Means



*** WARNING ***

Case 334 is an outlier (Studentized Residual = 3.484)
 Case 335 is an outlier (Studentized Residual = 3.675)

Durbin-Watson D Statistic 0.544

First Order Autocorrelation 0.726

COL/

ROW WELLS

1 MW-1S

2 MW-6B

Using least squares means.

Post Hoc test of HD_VALUE

Using model MSE of 172.471 with 82 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	4.246	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.143	1.000

Data for the following results were selected according to:

(PARAM_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-6B

2 case(s) deleted due to missing data.

Dep Var: HD_LN_VALU N: 82 Multiple R: 0.118 Squared multiple R: 0.014

$$\text{Estimates of effects } B = (X'X)^{-1} X'Y$$

HD_LN_VALU

CONSTANT		2.355
WELL\$	MW-1S	0.100

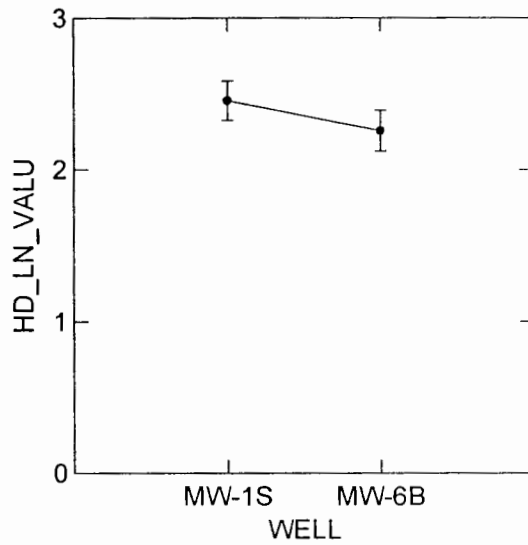
Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	0.811	1	0.811	1.137	0.289
Error	57.056	80	0.713		

Least squares means.

		LS Mean	SE	N
WELL\$	=MW-1S	2.455	0.129	43
WELL\$	=MW-6B	2.255	0.135	39

Least Squares Means



Durbin-Watson D Statistic 0.815
 First Order Autocorrelation 0.588
 COL/

ROW WELL\$
 1 MW-1S
 2 MW-6B

Using least squares means.
 Post Hoc test of HD_LN_VALU

Using model MSE of 0.713 with 80 df.
 Matrix of pairwise mean differences:

	1	2
1	0.000	
2	-0.199	0.000

Tukey HSD Multiple Comparisons.
 Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.289	1.000

IMPORT successfully completed.

790 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Oct99\1-7.SYD,
created Sat Dec 11, 1999 at 13:49:38, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
--------	------------	-------	----------	----------	------------

Data for the following results were selected according to:
(PARAM_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)
MW-1S, MW-7

Dep Var: HD_VALUE N: 88 Multiple R: 0.708 Squared multiple R: 0.502

Estimates of effects $B = (X'X)^{-1} X'Y$

	HD_VALUE
CONSTANT	40.532
WELL\$ MW-1S	-28.168

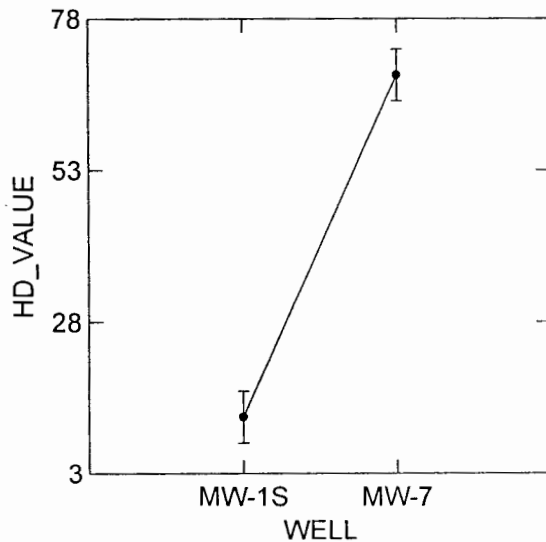
Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	69823.289	1	69823.289	86.599	0.000
Error	69340.302	86	806.283		

Least squares means.

	LS Mean	SE	N
WELL\$ =MW-1S	12.364	4.281	44
WELL\$ =MW-7	68.700	4.281	44

Least Squares Means



*** WARNING ***

Case 448 is an outlier (Studentized Residual = 3.895)
Case 730 is an outlier (Studentized Residual = 3.453)

Durbin-Watson D Statistic 1.343
First Order Autocorrelation 0.301

COL/

ROW WELL\$

1 MW-1S

2 MW-7

Using least squares means.

Post Hoc test of HD_VALUE

Using model MSE of 806.283 with 86 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	56.336	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Data for the following results were selected according to:

(PARAM_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-7

2 case(s) deleted due to missing data.

Dep Var: HD_LN_VALU N: 86 Multiple R: 0.768 Squared multiple R: 0.590

$$\text{Estimates of effects } B = (X'X)^{-1} X'Y$$

HD_LN_VALU

CONSTANT		3.214
WELL\$	MW-1S	-0.759

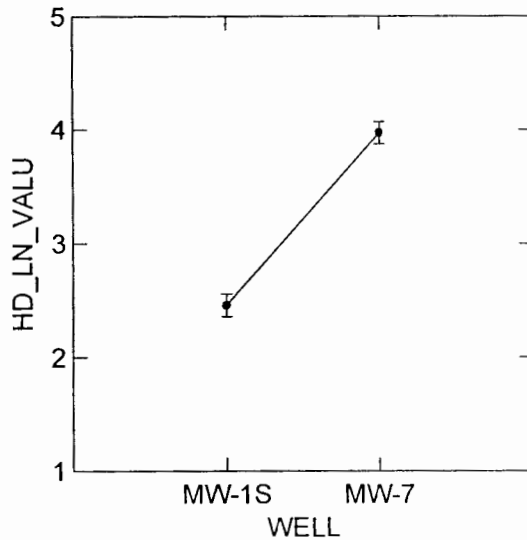
Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	49.574	1	49.574	120.845	0.000
Error	34.459	84	0.410		

Least squares means.

		LS Mean	SE	N
WELL\$	=MW-1S	2.455	0.098	43
WELL\$	=MW-7	3.973	0.098	43

Least Squares Means



*** WARNING ***

Case 336 is an outlier (Studentized Residual = -6.546)

Durbin-Watson D Statistic 1.722

First Order Autocorrelation 0.131

COL/

ROW WELLS

1 MW-1S

2 MW-7

Using least squares means.

Post Hoc test of HD_LN_VALU

Using model MSE of 0.410 with 84 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	1.518	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

IMPORT successfully completed.

790 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Oct99\1-9.SYD,
created Sat Dec 11, 1999 at 13:49:44, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
--------	------------	-------	----------	----------	------------

Data for the following results were selected according to:
(PARAM_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-9

Dep Var: HD_VALUE N: 88 Multiple R: 0.616 Squared multiple R: 0.380

Estimates of effects $B = (X'X)^{-1} X'Y$

	HD_VALUE
CONSTANT	191.602
WELL\$ MW-1S	-179.239

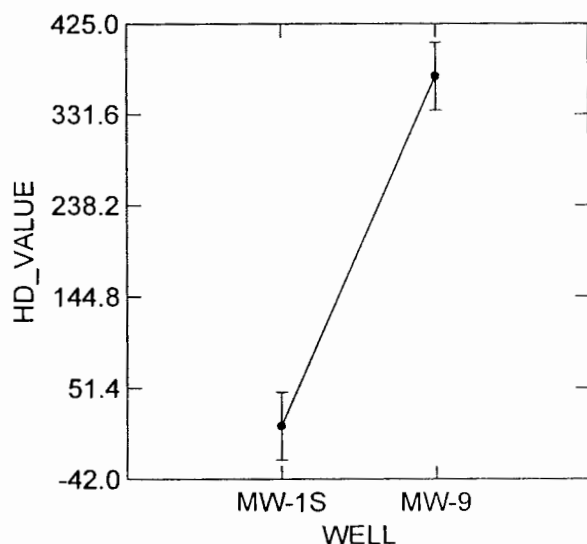
Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	2827131.011	1	2827131.011	52.692	0.000
Error	4614202.308	86	53653.515		

Least squares means.

		LS Mean	SE	N
WELL\$	=MW-1S	12.364	34.920	44
WELL\$	=MW-9	370.841	34.920	44

Least Squares Means



*** WARNING ***

Case	359 is an outlier	(Studentized Residual =	3.371)
Case	694 is an outlier	(Studentized Residual =	4.486)
Case	712 is an outlier	(Studentized Residual =	3.910)

Durbin-Watson D Statistic 1.309

First Order Autocorrelation 0.345

COL/

ROW WELL\$

1 MW-1S

2 MW-9

Using least squares means.

Post Hoc test of HD_VALUE

Using model MSE of 53653.515 with 86 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	358.477	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Data for the following results were selected according to:
(PARAM_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-9

2 case(s) deleted due to missing data.

Dep Var: HD_LN_VALU N: 86 Multiple R: 0.840 Squared multiple R: 0.705

Estimates of effects $B = (X'X)^{-1} X'Y$

	HD_LN_VALU
CONSTANT	3.873
WELL\$ MW-1S	-1.418

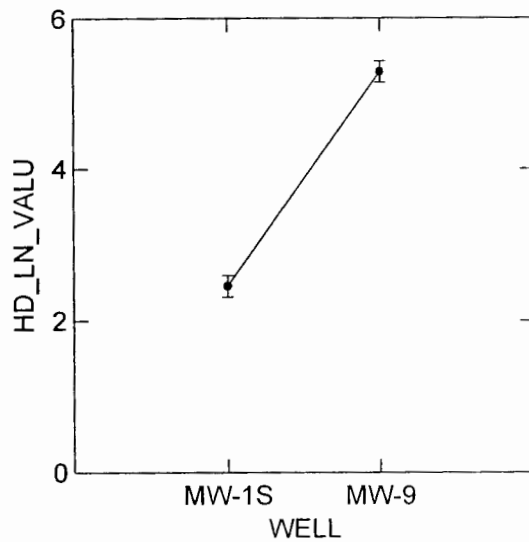
Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	172.920	1	172.920	201.219	0.000
Error	72.186	84	0.859		

Least squares means.

		LS Mean	SE	N
WELL\$	=MW-1S	2.455	0.141	43
WELL\$	=MW-9	5.291	0.141	43

Least Squares Means



Durbin-Watson D Statistic 1.235
 First Order Autocorrelation 0.365
 COL/
 ROW WELL\$
 1 MW-1S
 2 MW-9

Using least squares means.
 Post Hoc test of HD_LN_VALU

Using model MSE of 0.859 with 84 df.
 Matrix of pairwise mean differences:

	1	2
1	0.000	
2	2.836	0.000

Tukey HSD Multiple Comparisons.
 Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Appendix F

Annual Groundwater Monitoring Report for 1999

This annual report summarizes the groundwater monitoring which was conducted during 1999 at the Phibro-Tech, Inc. facility, based on four quarters of sampling which occurred in January, April, July, and October of 1999. Also included in this report are graphs with concentrations versus time for key compounds of concern at the facility.

F.1 Groundwater Elevation, Gradient, and Flow Direction

During each of the four quarters, depth to groundwater was measured at 15 shallow wells and seven deep wells at the facility. Table 5-1 in each of the quarterly reports from 1999 lists the depths to water and groundwater elevations for each well sampled.

During 1999 groundwater levels were lowest in October (shallow well elevations ranging from 103.95 to 106.70 feet above mean sea level [msl], and deep well elevations ranging from 103.88 to 106.55 feet above msl) and highest in January (shallow well elevations 111.87 to 113.94 feet above msl, and deep well elevations 111.92 to 114.00 feet above msl).

Groundwater gradients in the shallow wells during 1999 ranged from 0.32 foot per 100 feet (July) to 0.39 foot per 100 feet (April). In the deep wells the groundwater gradients ranged from 0.38 foot per 100 feet (January) to 0.42 foot per 100 feet (October).

Direction of groundwater flow in the shallow wells during 1999 ranged from S 45° W (July) to S 76° W (January). The groundwater flow direction in the deep wells ranged from S 48° W (July) to S 78° W (January).

F.2 Groundwater Quality

Table 6-1 of each quarterly groundwater monitoring report contains current and historical concentrations of key contaminants of concern (total and hexavalent chromium, cadmium, copper, purgeable aromatic compounds, and trichloroethene), and groundwater elevations for each shallow groundwater monitoring well. Specific compounds of concern are discussed below with respect to groundwater monitoring in 1999.

Trichloroethene

As in previous years, trichloroethene (TCE) was the primary purgeable halogenated organic compound detected in 1999. It was detected in all 14 monitoring wells sampled during every quarter. The highest concentration of TCE detected in 1999 was 740 micrograms per liter ($\mu\text{g/L}$) in shallow well MW-9 during the July sampling event. The highest concentration detected in the deep wells was 14 $\mu\text{g/L}$ in MW-04A during the January sampling round. Historical TCE concentrations, including 1998 data, for each shallow well are shown on the accompanying graphs. Table 6-2 of each quarterly monitoring report presents the analytical results for TCE, as well as other purgeable halogenated compounds.

Purgeable Aromatic Organic Compounds

Table 6-3 of each quarterly monitoring report presents the analytical results for purgeable aromatic organic compounds. Historical evidence indicates that benzene is not a contaminant of concern for the facility. During 1999 it was detected in MW-04 and MW-14S at concentrations ranging from 1.1 $\mu\text{g/L}$ to 3.5 $\mu\text{g/L}$. The highest concentration of total BTEX compounds (benzene, toluene, ethylbenzene, and xylenes) detected in 1999 was 3,540 $\mu\text{g/L}$ in MW-11 during the April sampling event. Historical BTEX concentrations for each shallow well are shown on the accompanying graphs.

Total Chromium

Each quarterly monitoring report presents the analytical results for total chromium, as well as other metal compounds on Table 6-4. Chromium was detected in seven wells during 1999, however, the only wells which had detections above the maximum contaminant level (MCL) of 0.05 mg/l were MW-04 and MW-09 (all four quarters) and MW-15D (in April). The concentrations of total chromium in MW-04 ranged from 42.8 mg/L in April to 105.0 mg/L in October. The total chromium concentration in MW-09 ranged from 0.64 mg/L in April to 5.6 mg/L in July. This is the first time since 1990 that MW-09 had concentrations of total chromium greater than the MCL for all four quarters. Total chromium concentration was detected only over in the four quarters in MW-15D at 0.35 mg/L in April. However, hexavalent chromium was not detected in that sample at a detection limit of 0.02 mg/L. Historical total chromium concentrations for each of the shallow wells are shown on the accompanying graphs.

Hexavalent Chromium

Hexavalent chromium is associated almost exclusively with monitoring well MW-04. During 1999, detections of hexavalent chromium in MW-04 ranged from 0.57 mg/L in April to 78.6 mg/L in January. The only other detections in 1999 were in wells MW-10 (0.014 mg/L), MW-04A (0.017 mg/L to 0.02 mg/L), MW-09 (3.3 mg/L to 5.8 mg/L), MW-11 (0.057 mg/L), MW-14S (0.035 mg/L to 0.058 mg/L and MW-15S (0.014 to 0.024 mg/L). Historical hexavalent chromium concentrations for wells MW-04, MW-07, MW-09, and MW-14S are shown on the accompanying graphs. All other wells at the facility have had non-detections with only sporadic, low concentrations of hexavalent chromium over time.

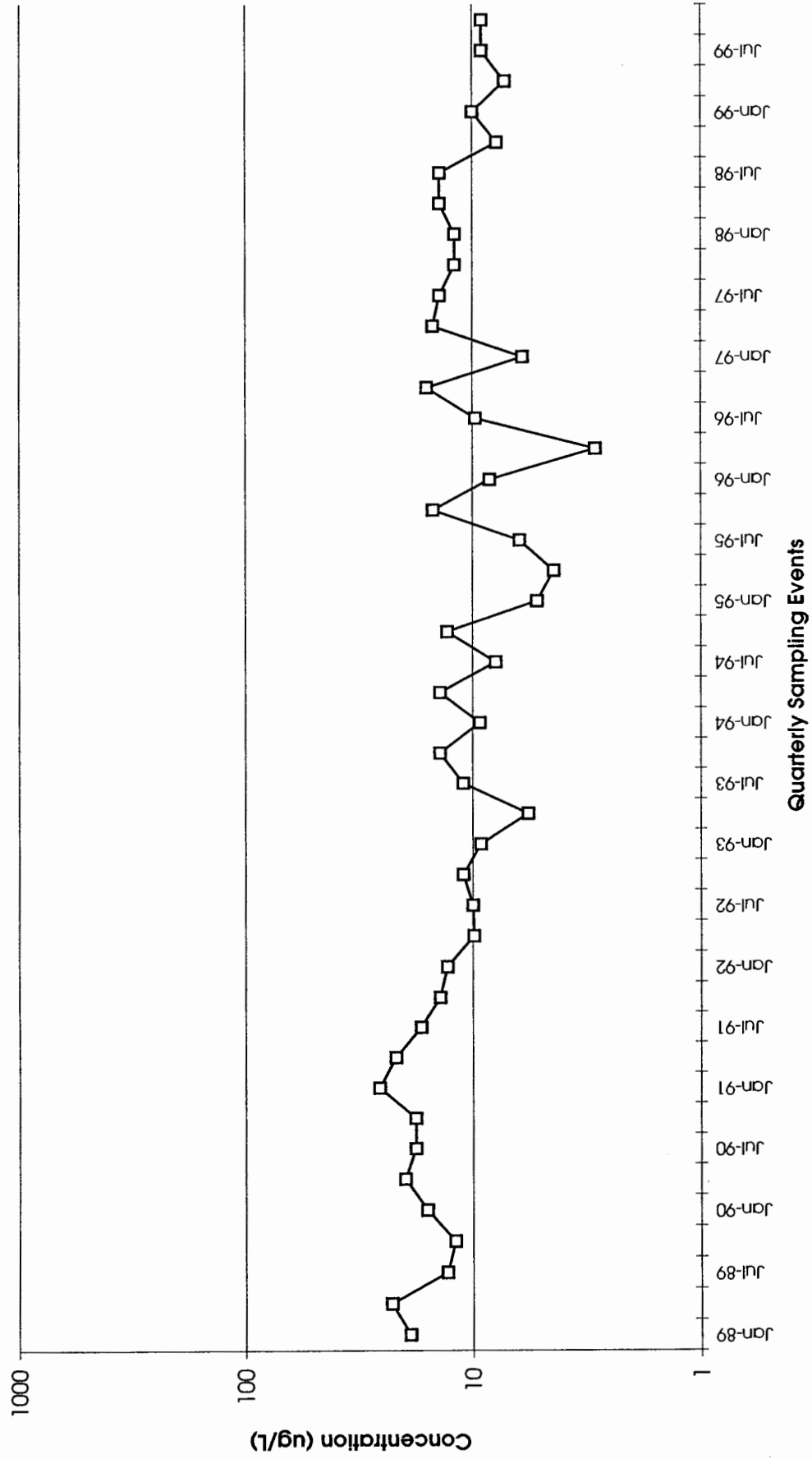
Cadmium

The only well which consistently has detections of cadmium is MW-04. During 1999, cadmium concentrations in MW-04 ranged from 0.41 mg/L in April to 0.59 mg/L in October. The only other concentration of cadmium detected in 1999 was in well MW-09 in January (0.0056 mg/L). Historical cadmium concentrations for MW-04, MW-14S, and MW-15S are shown on the accompanying graphs. Generally, all other wells at the facility have historically had only non-detections of cadmium.

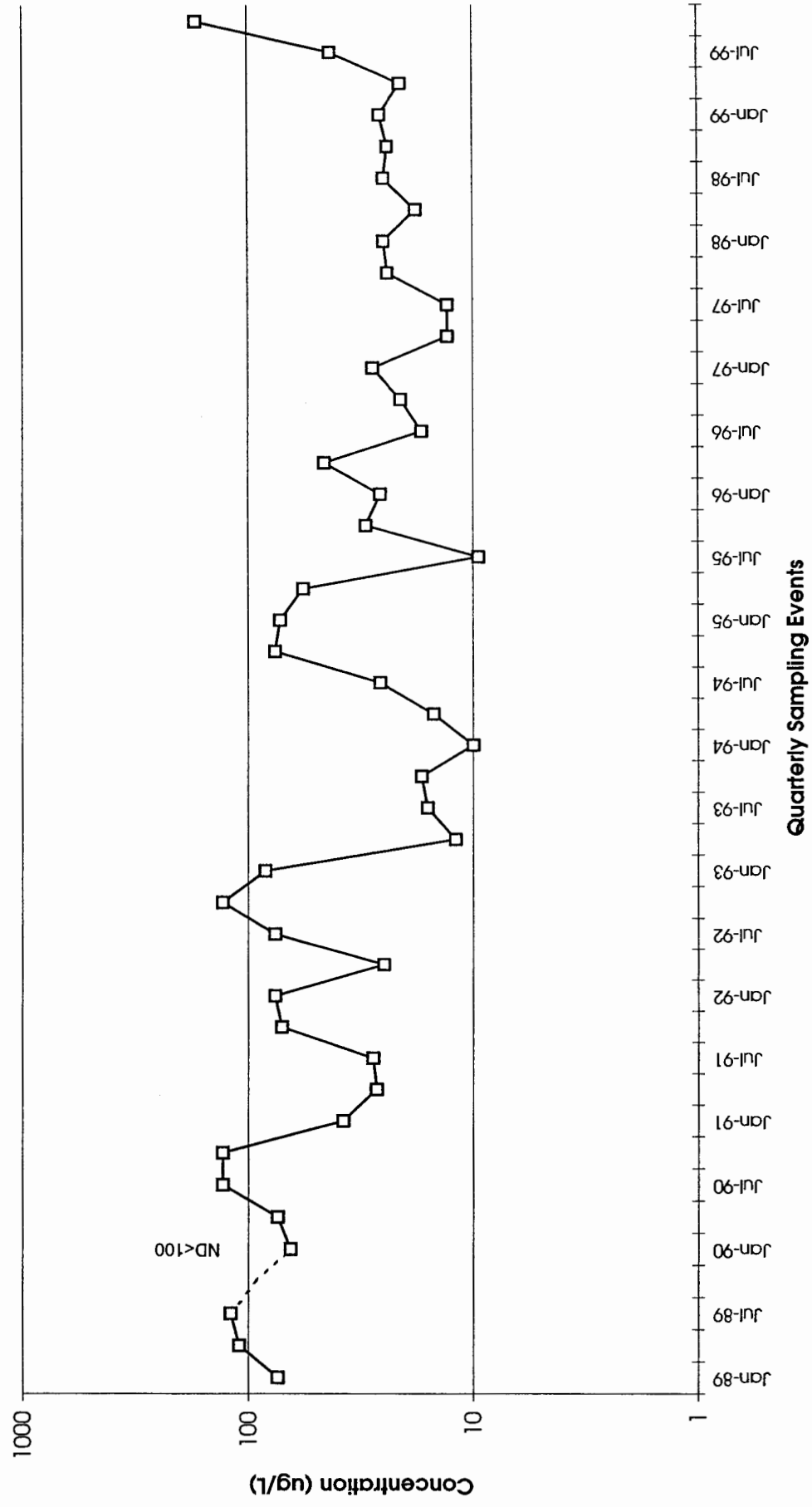
Copper

Copper was detected in a total of three wells in 1999 with concentrations ranging from 0.037 mg/L in MW-14S (July) to 0.071 mg/L in MW-07 (October). Historically copper has not been detected, or detected only occasionally in very low concentrations near the detection limit of 0.020 mg/L.

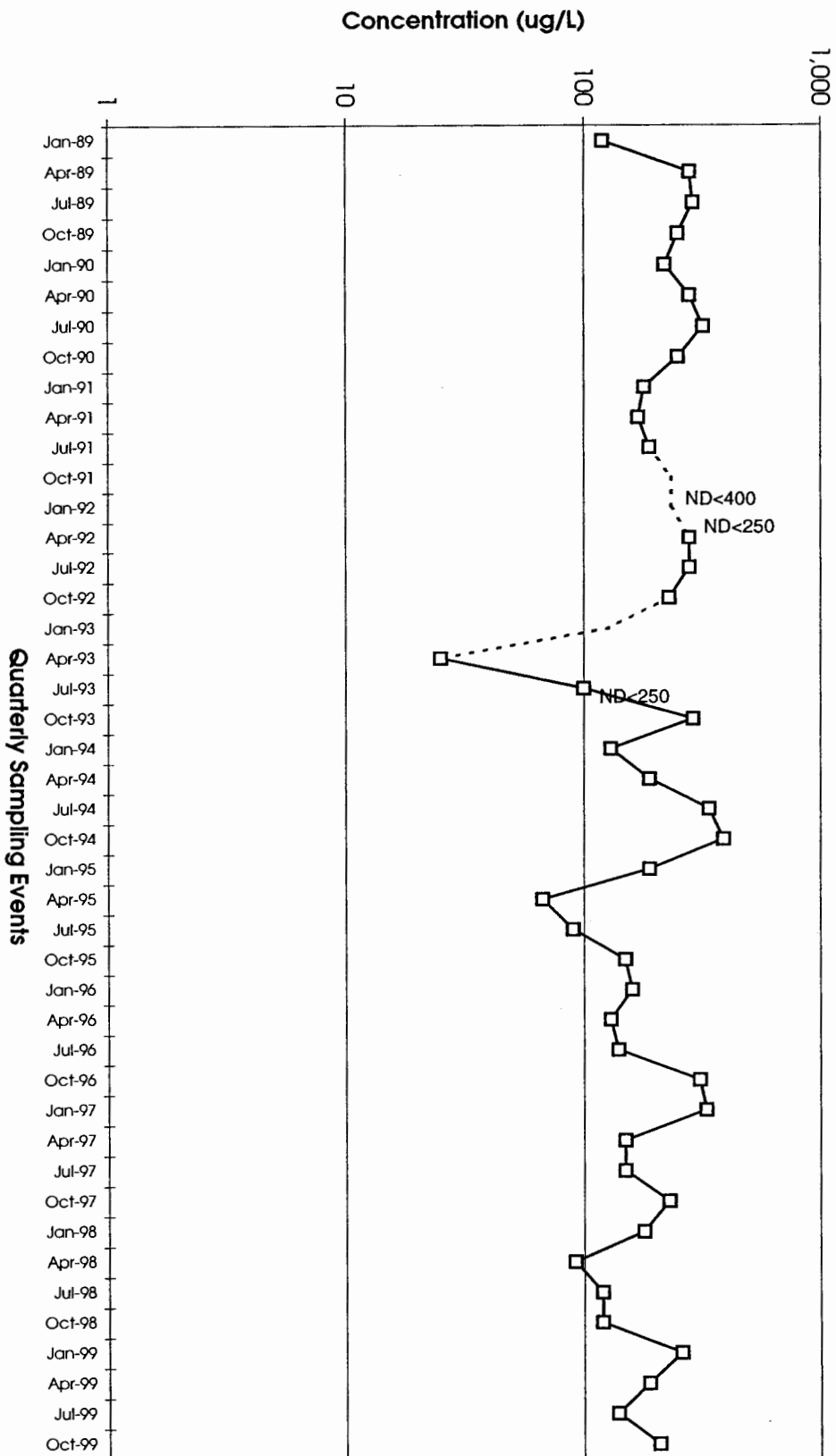
Phibro-Tech, Inc.
TCE Concentrations
MW-01S



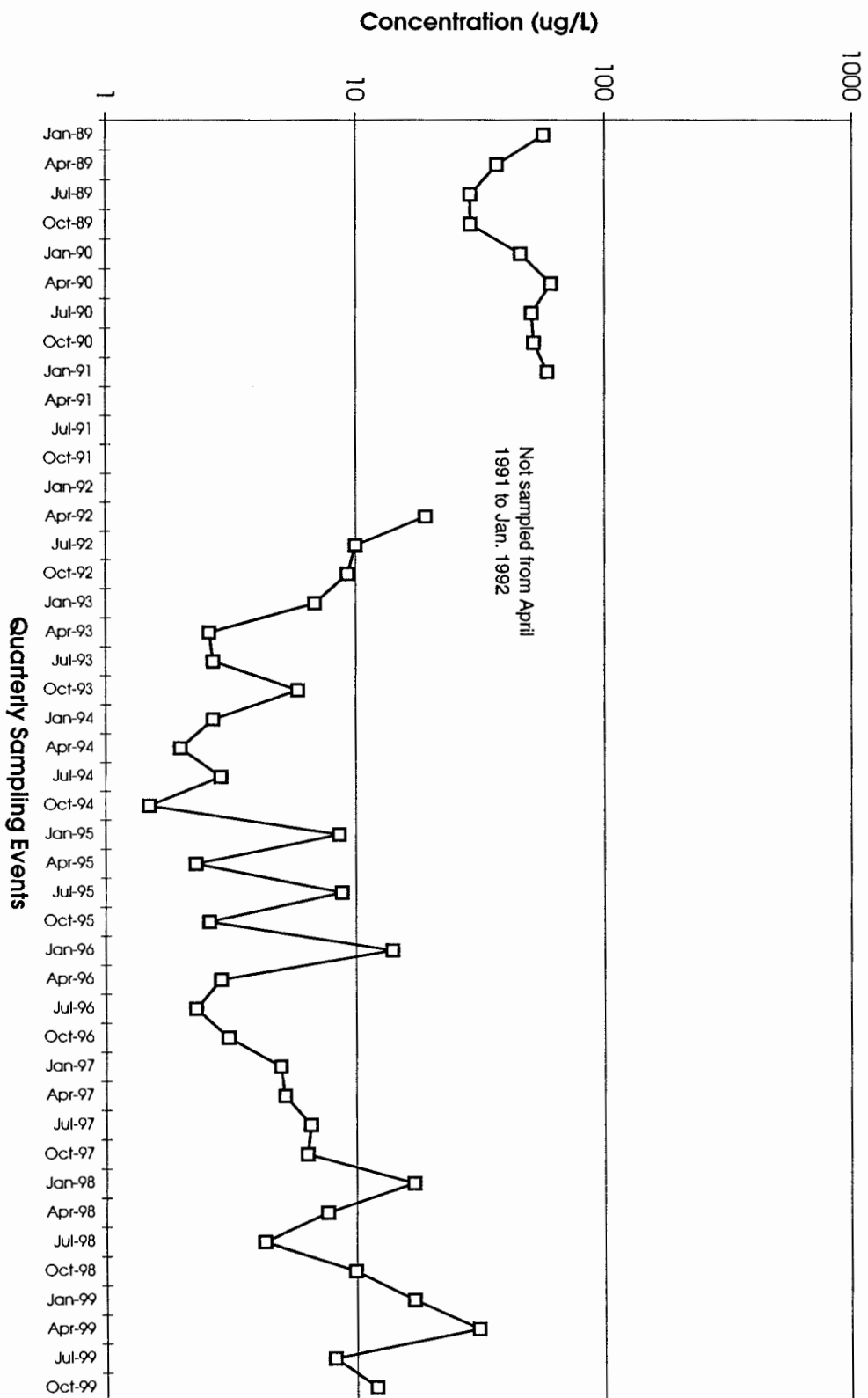
Phibro-Tech, Inc.
TCE Concentrations
MW-03



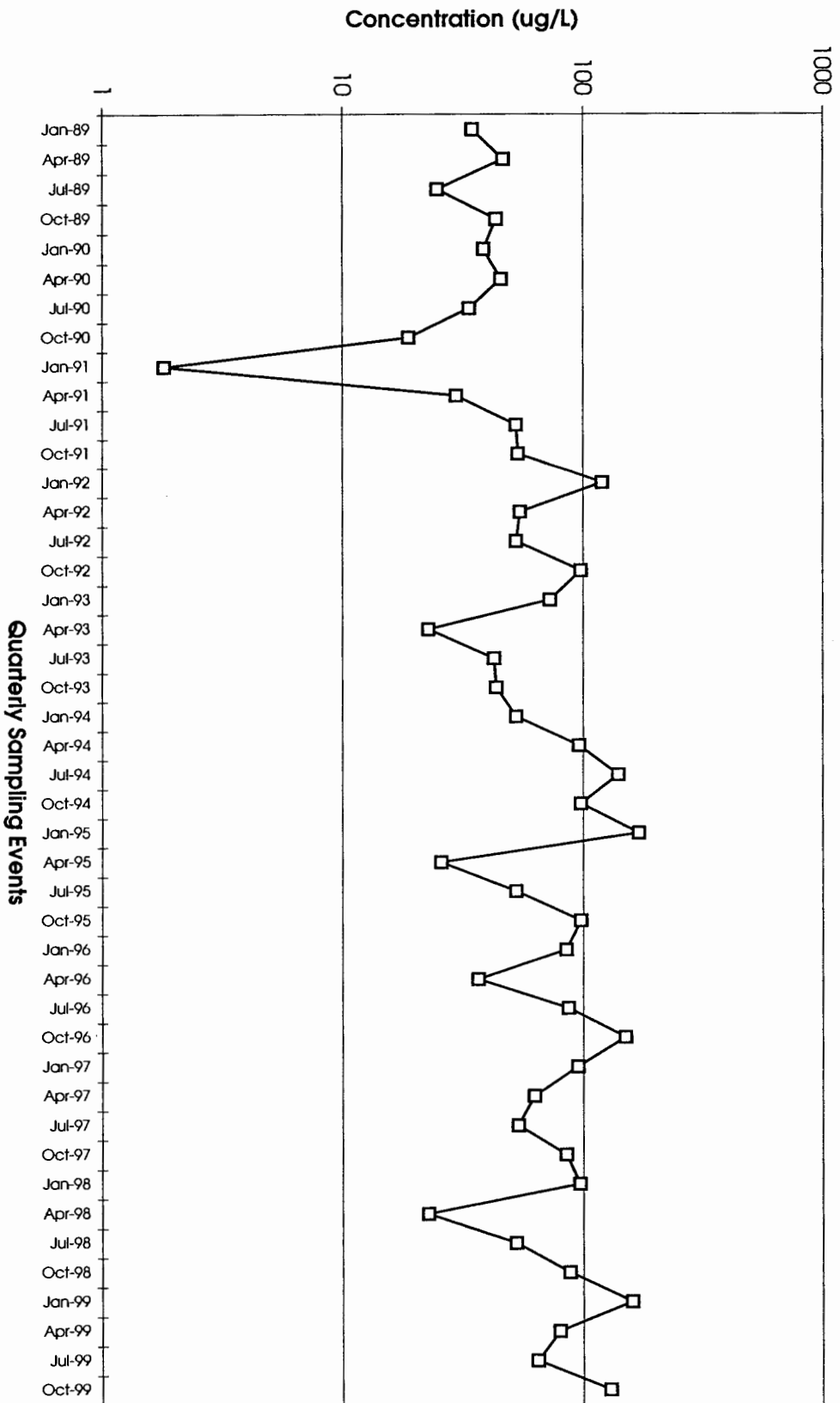
Phibro-Tech, Inc.
TCE Concentrations: MW-04



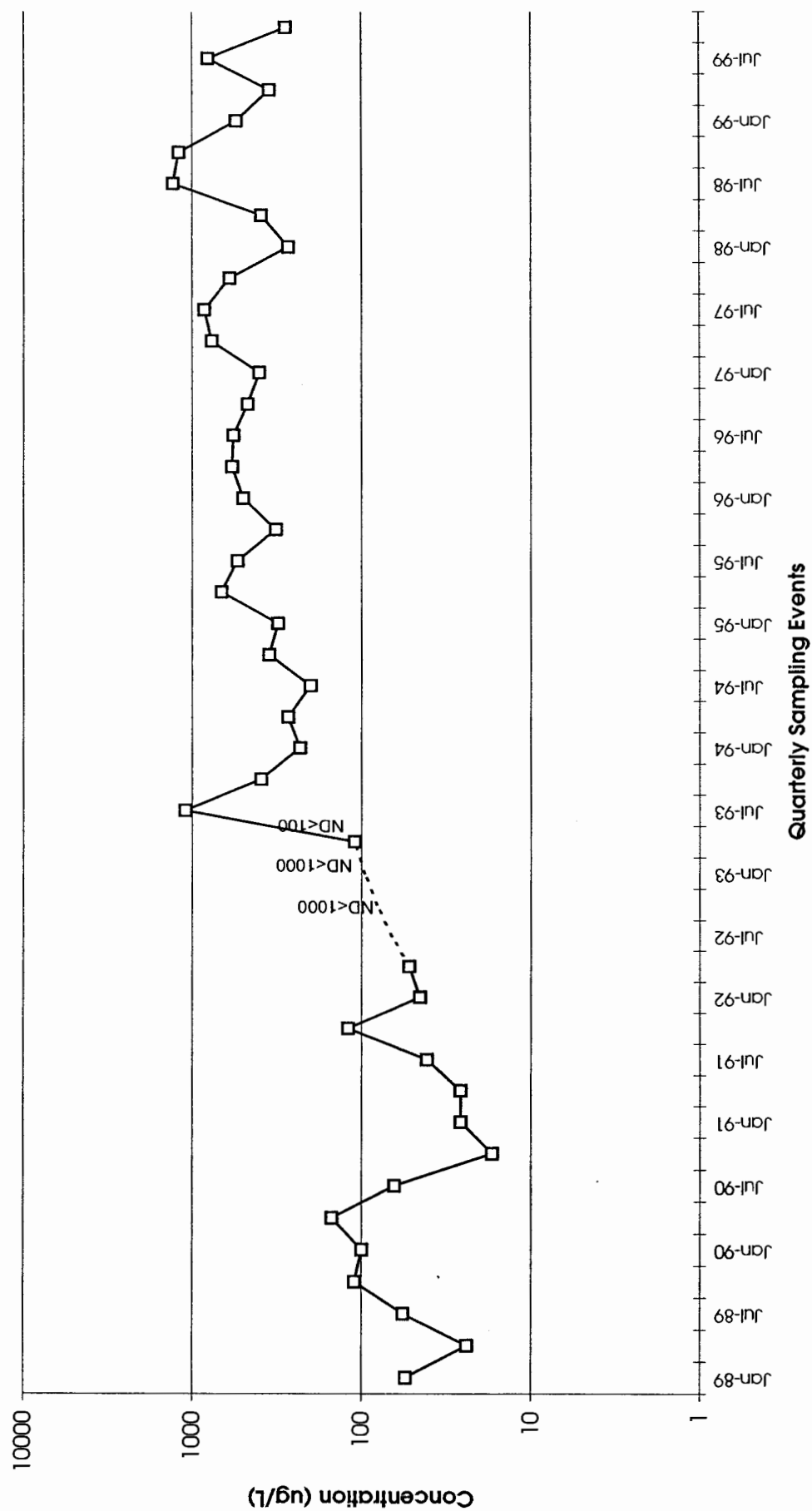
Phibro-Tech, Inc.
TCE Concentrations
MW-06B



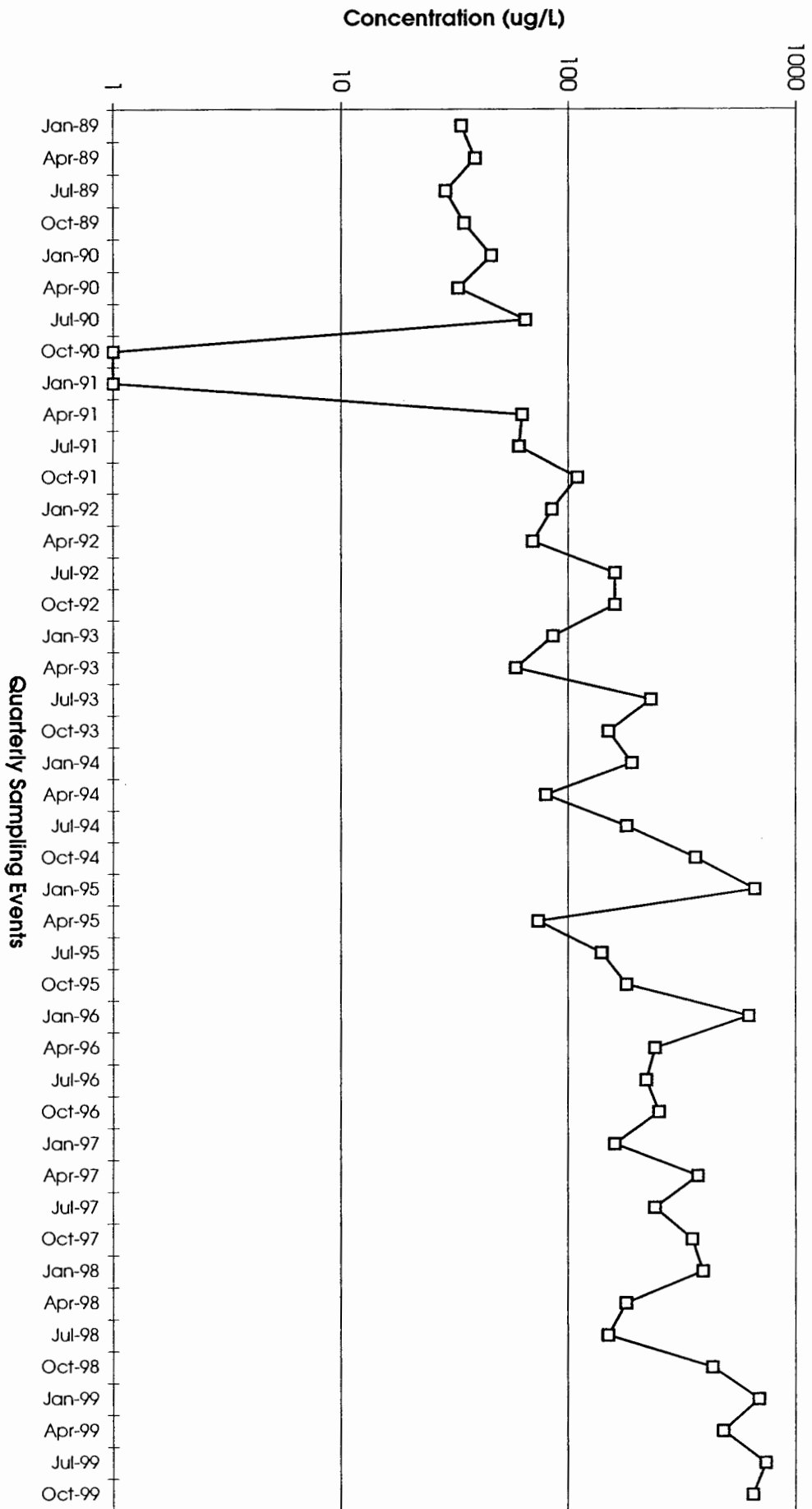
Phibro-Tech, Inc.
TCE Concentrations
MW-07



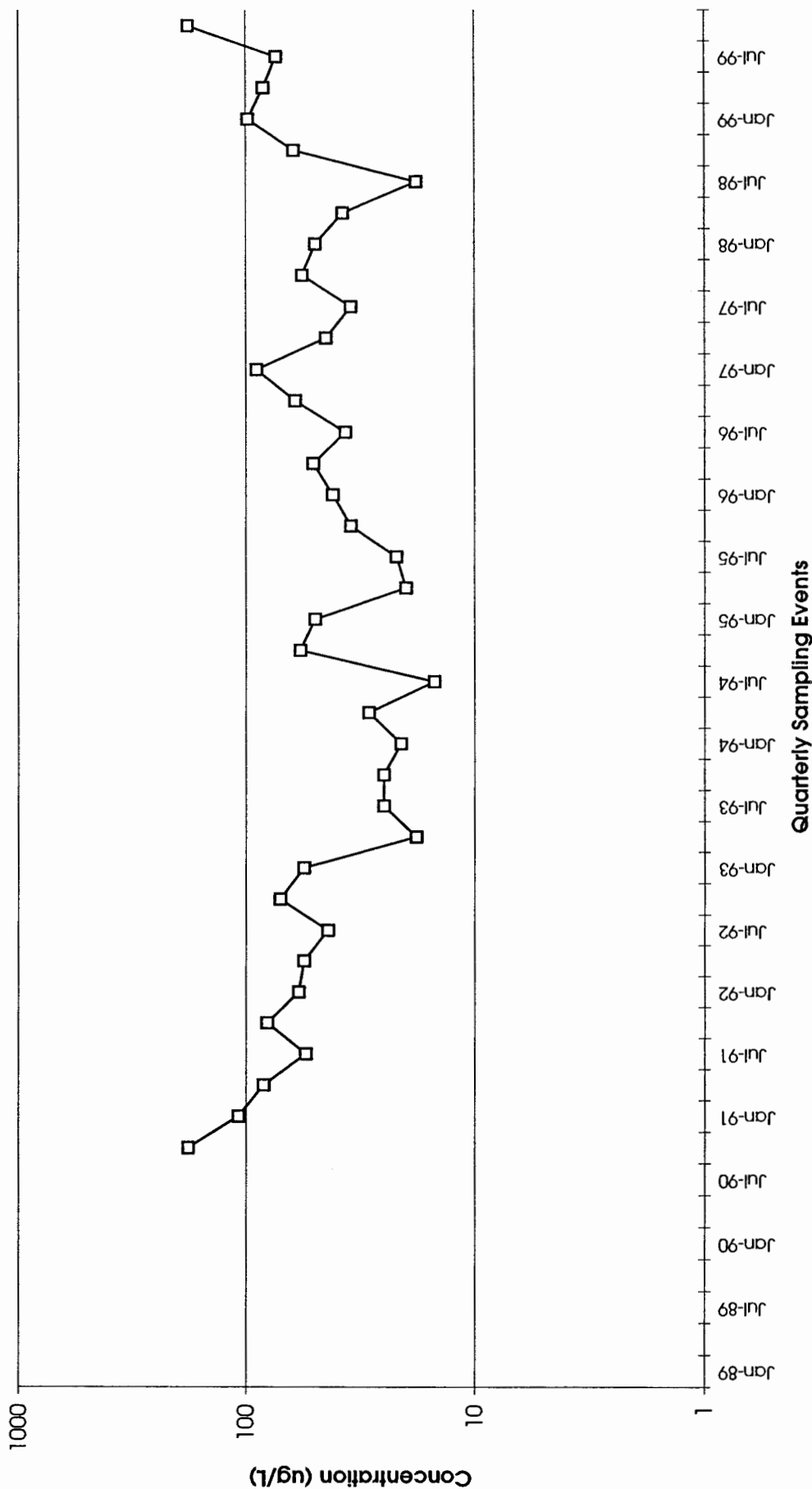
Phibro-Tech, Inc.
TCE Concentrations: MW-09



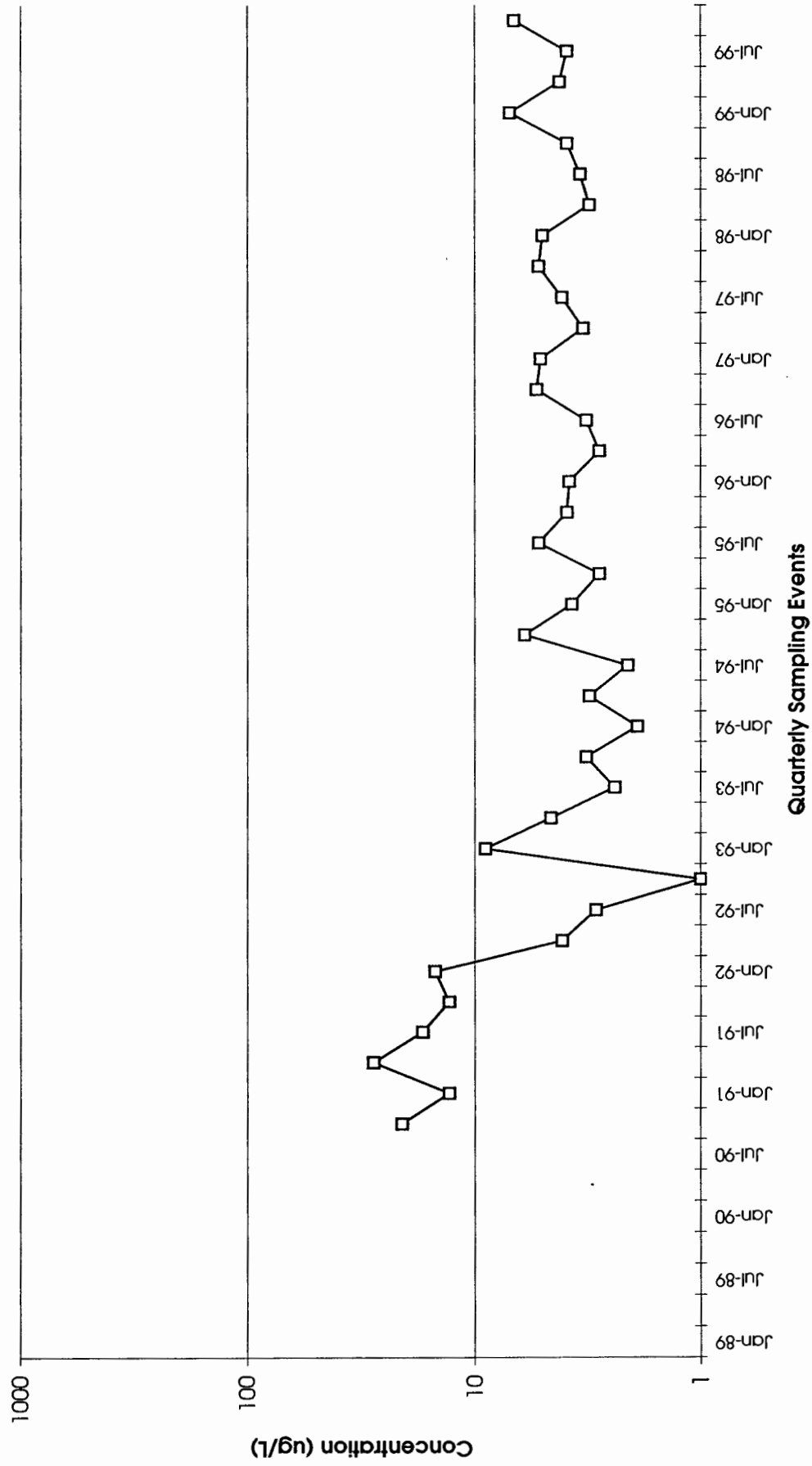
Phibro-Tech, Inc.
TCE Concentrations
MW-11



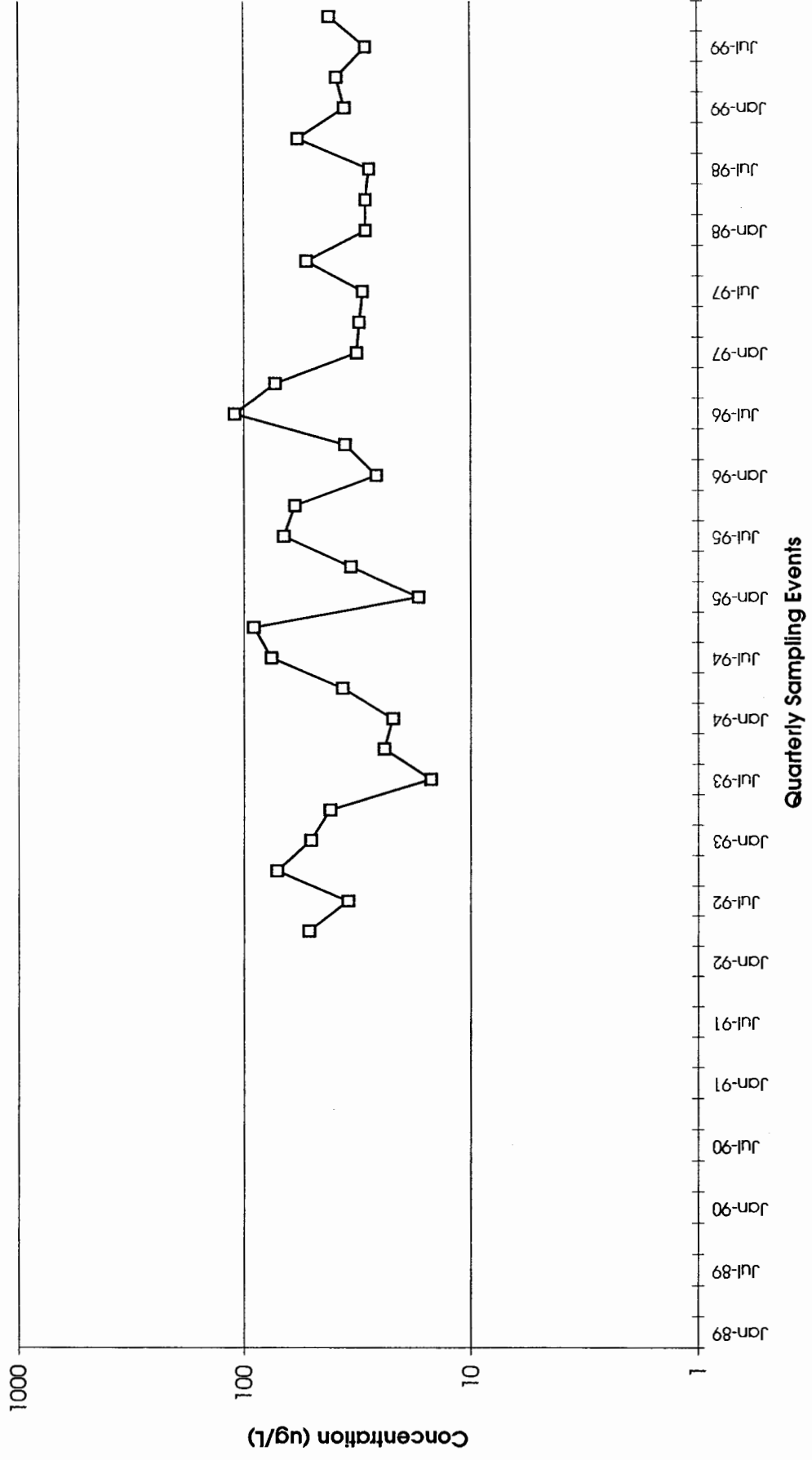
Phibro-Tech, Inc.
TCE Concentrations
MW-14S



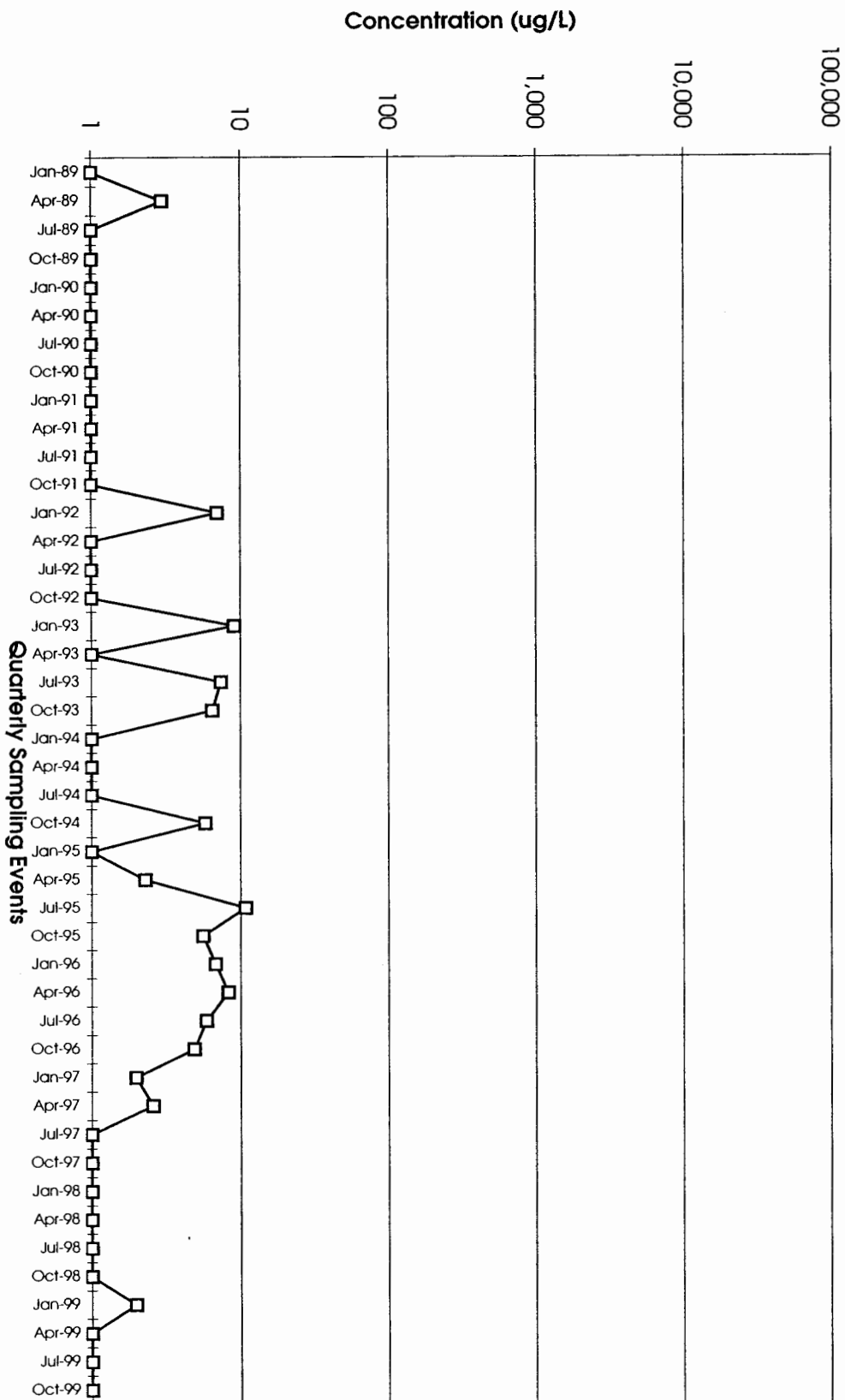
Phibro-Tech, Inc.
TCE Concentrations
MW-15S



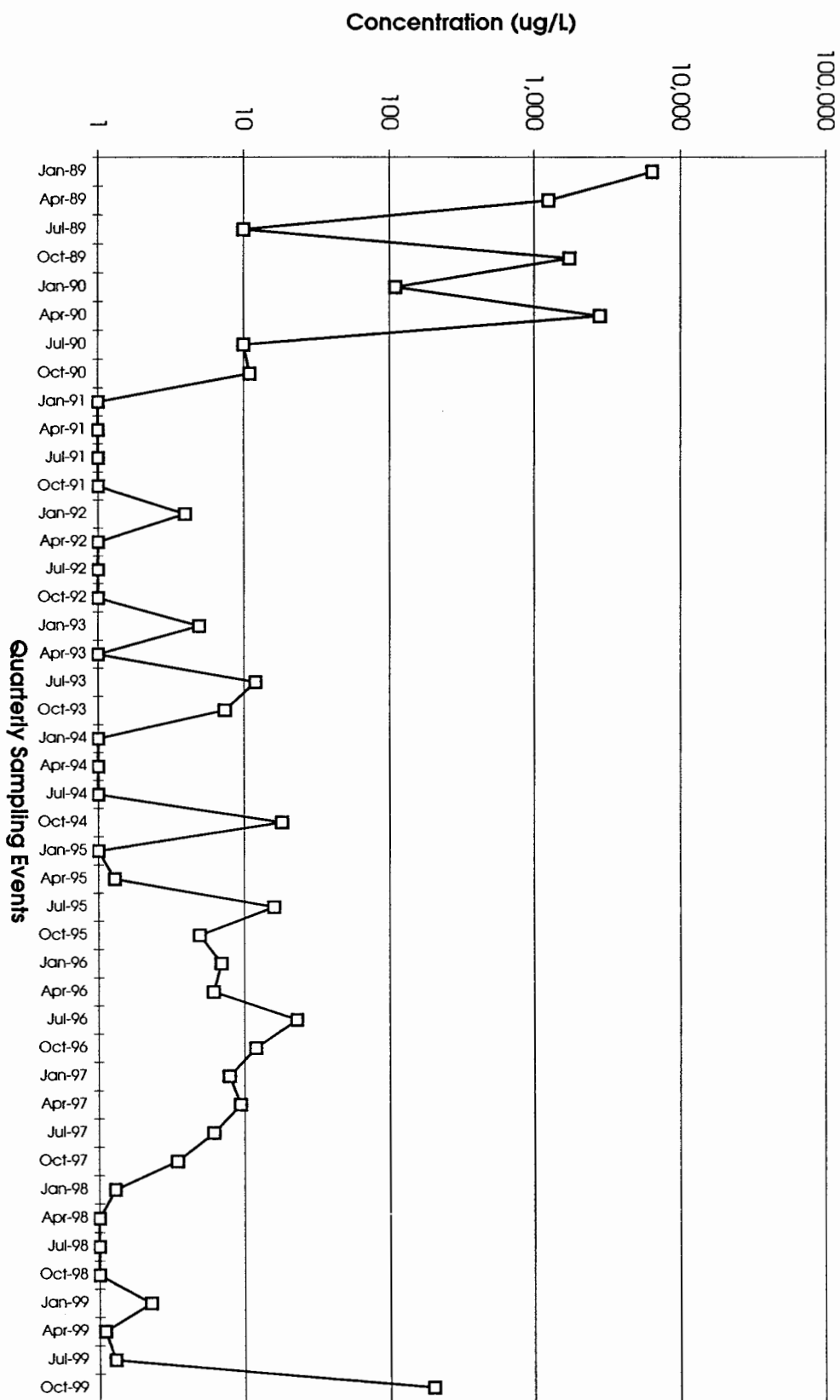
Phibro-Tech, Inc.
TCE Concentrations
MW-16



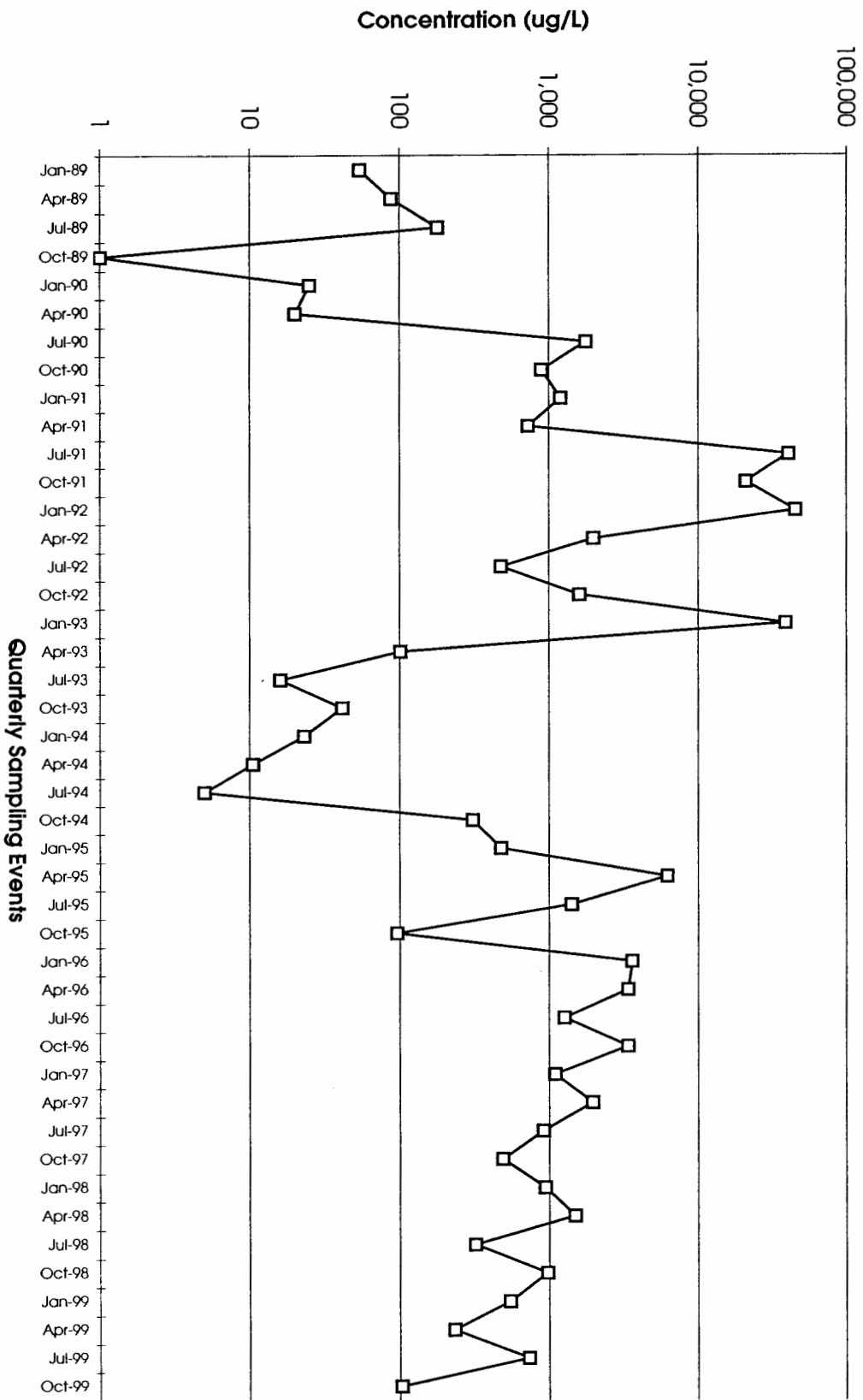
Phibro-Tech, Inc.
Total BTEX Concentrations
MW-01S



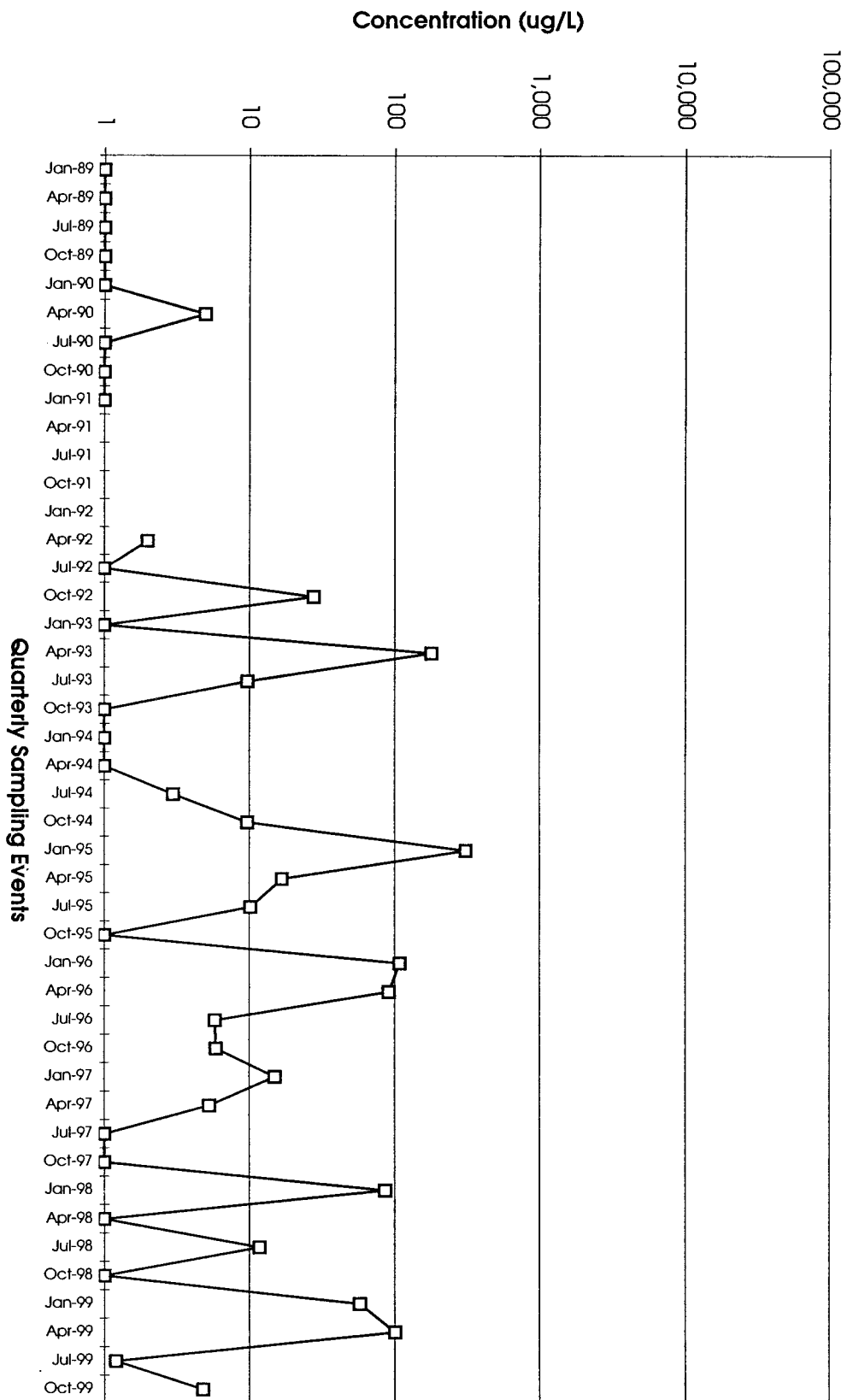
Phibro-Tech, Inc.
Total BTEX Concentrations
MW-03



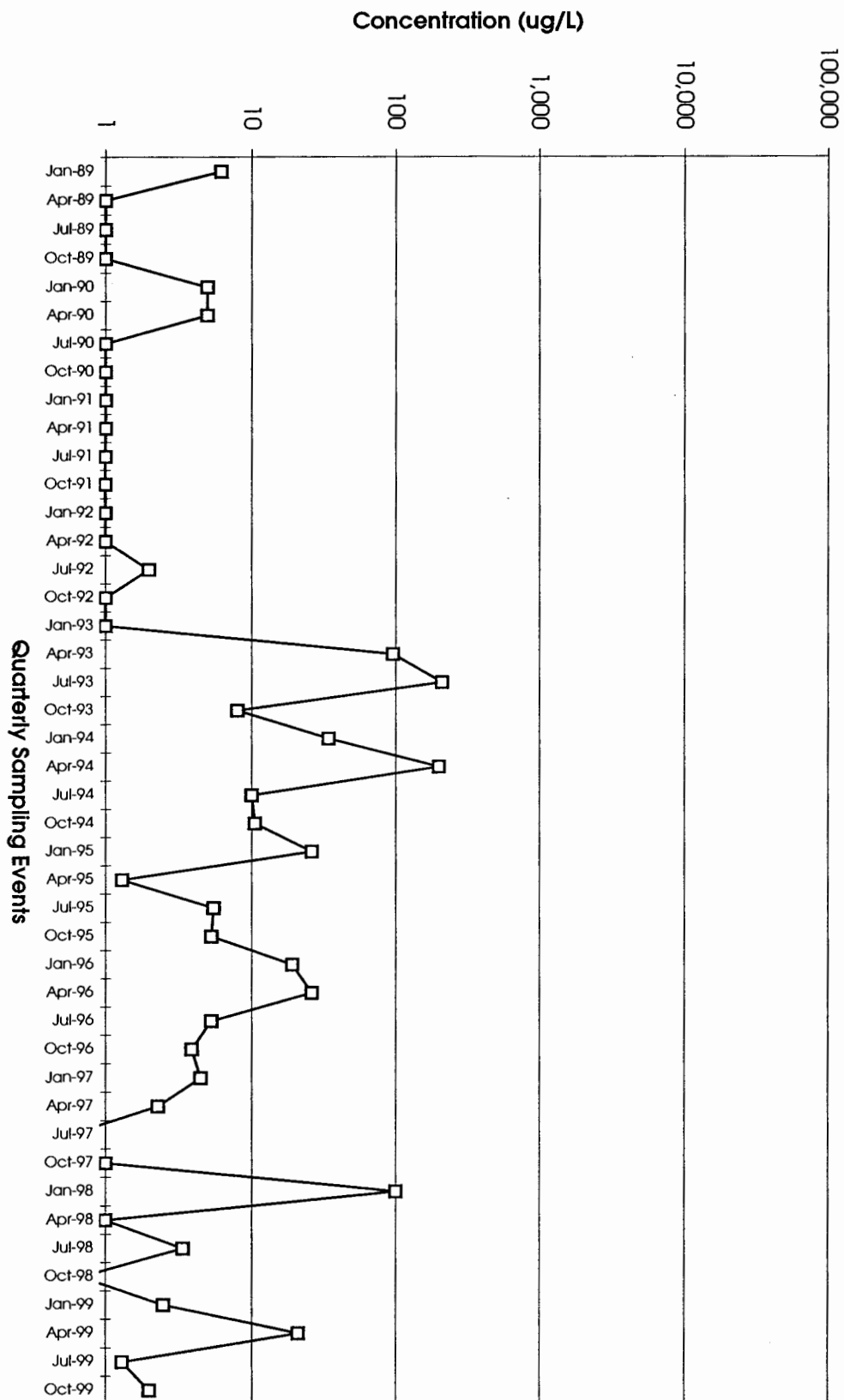
Phibro-Tech, Inc.
Total BTEX Concentrations
MW-04



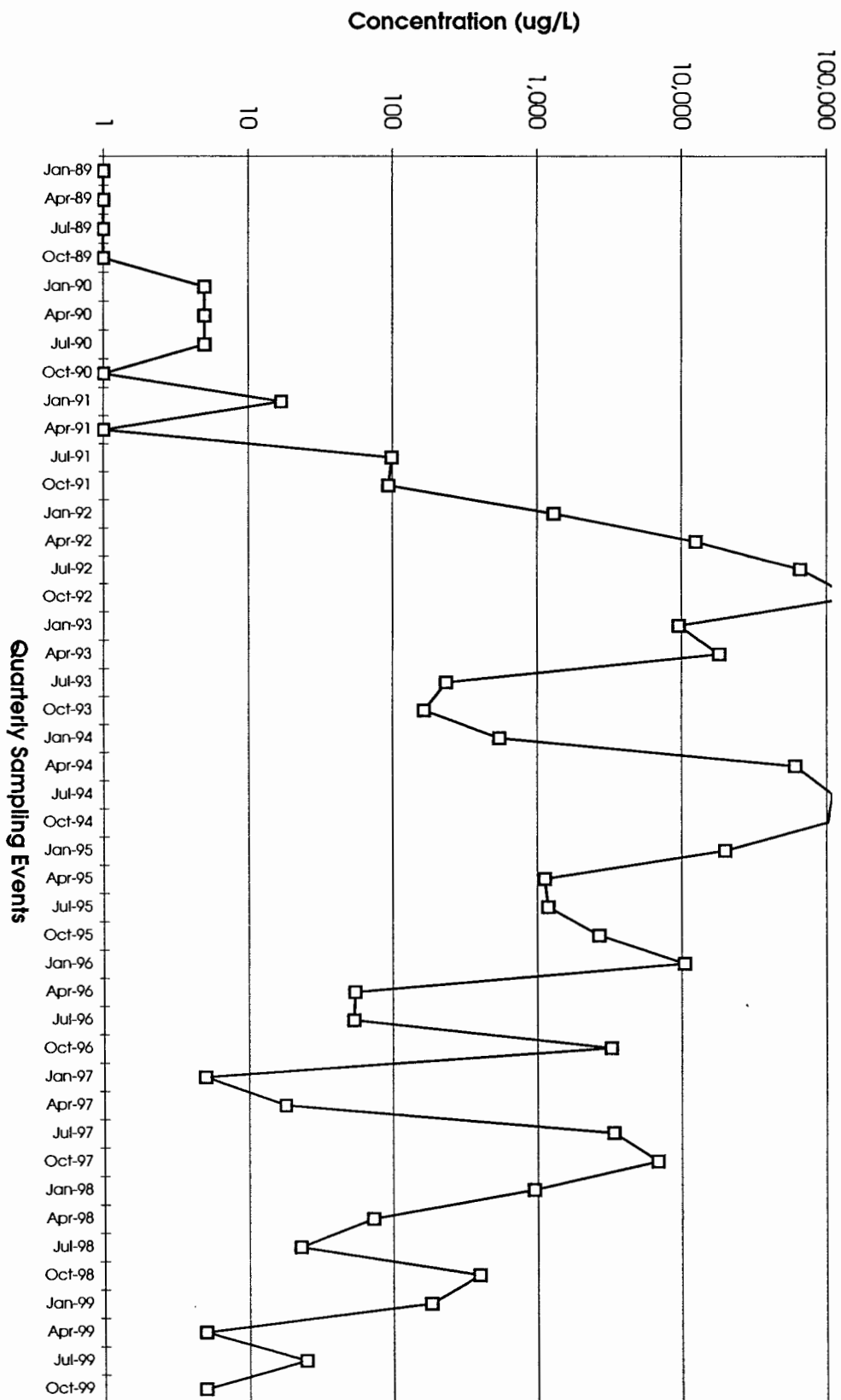
Phibro-Tech, Inc.
Total BTEX Concentrations
MW-06B



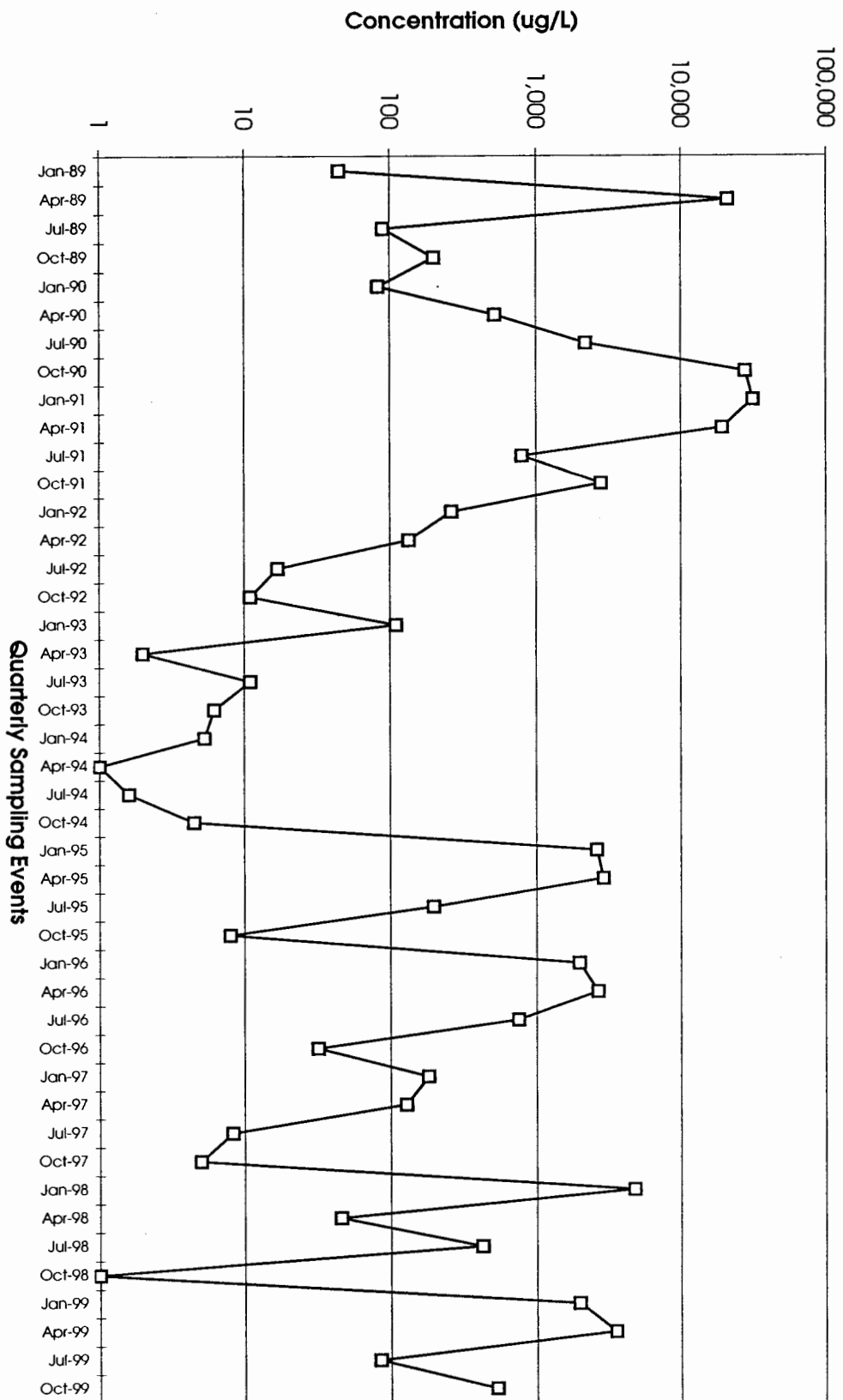
Phibro-Tech, Inc.
Total BTEX Concentrations
MW-07



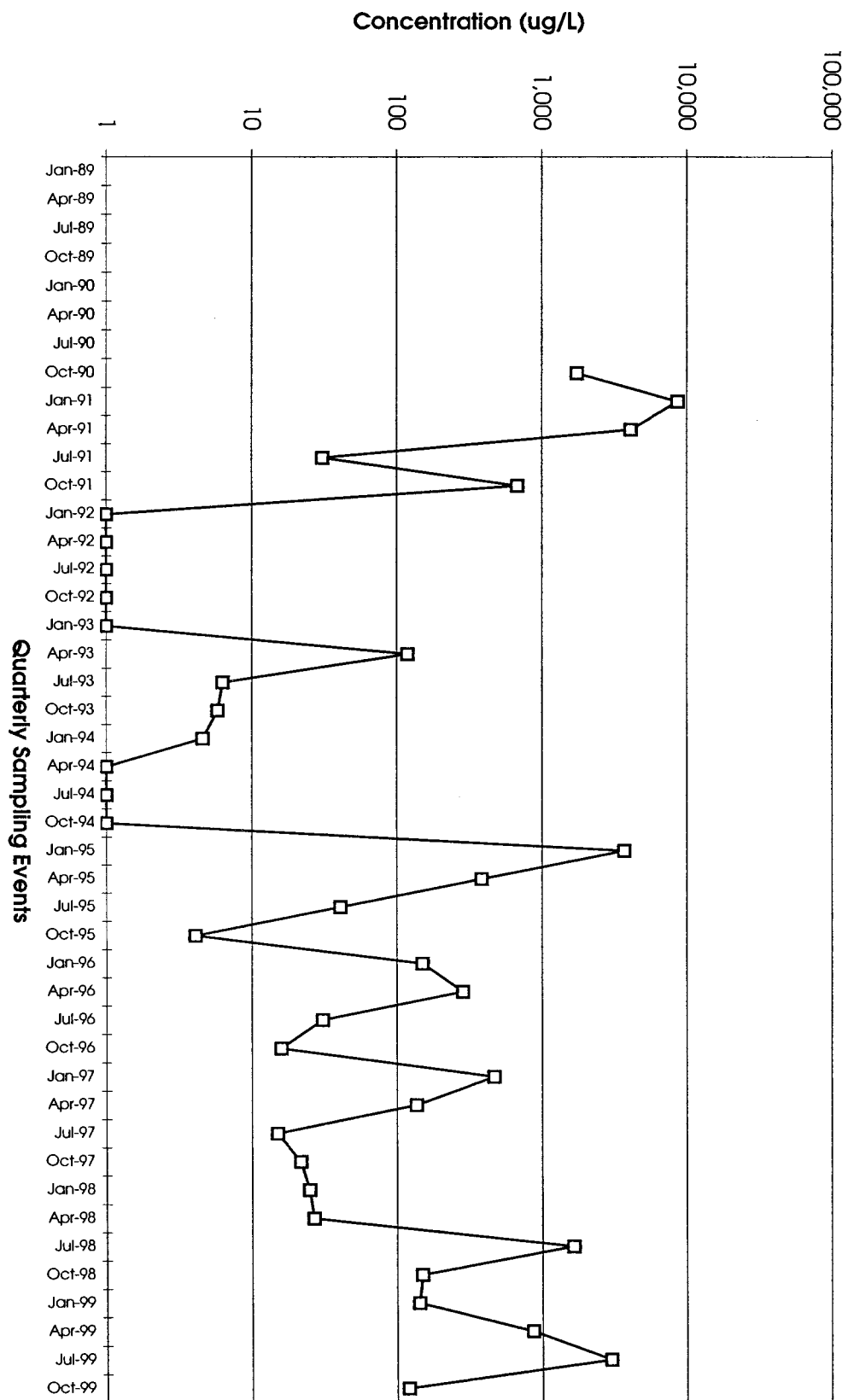
Phibro-Tech, Inc.
Total BTEX Concentrations
MW-09



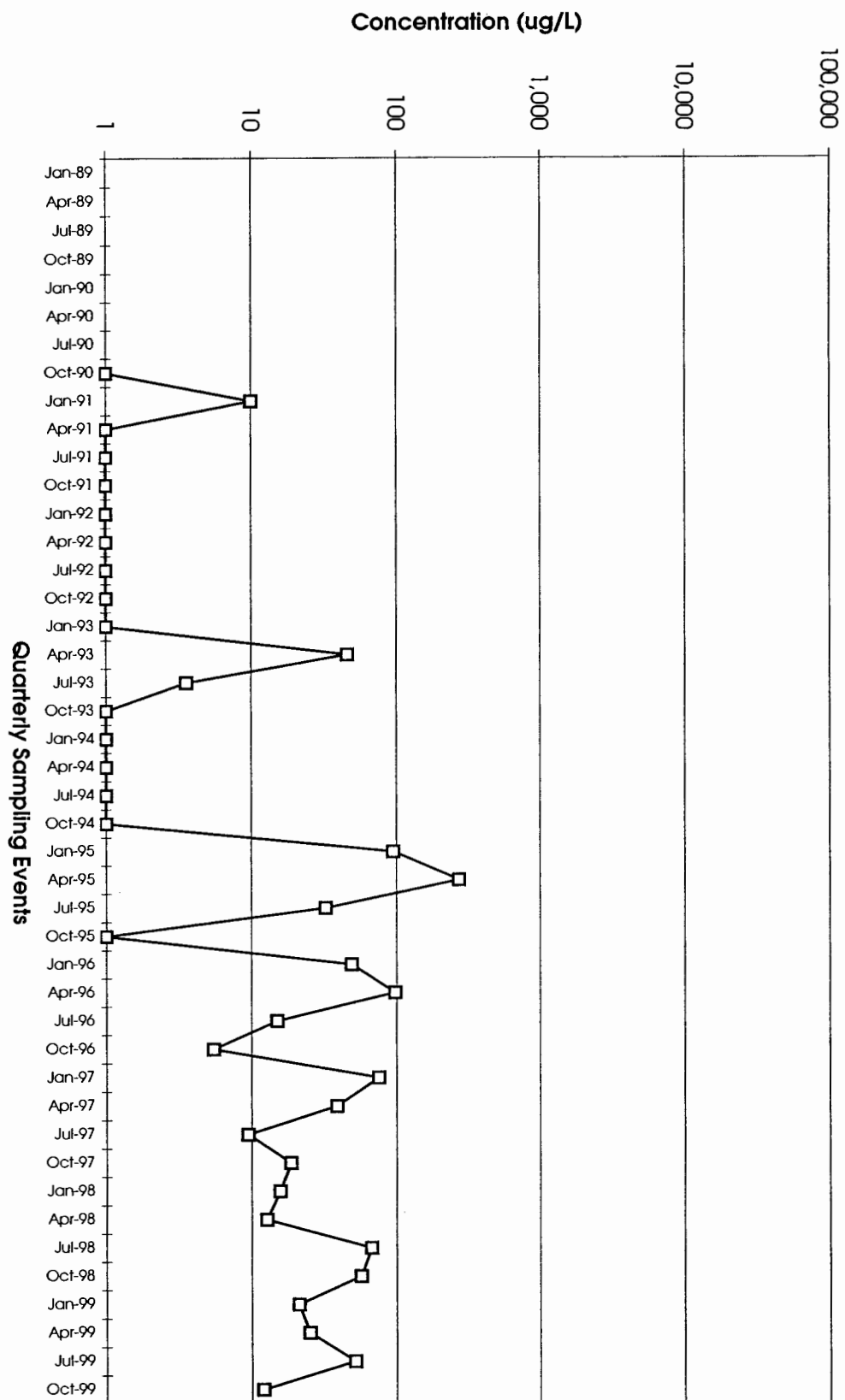
Phibro-Tech, Inc.
Total BTEX Concentrations
MW-11



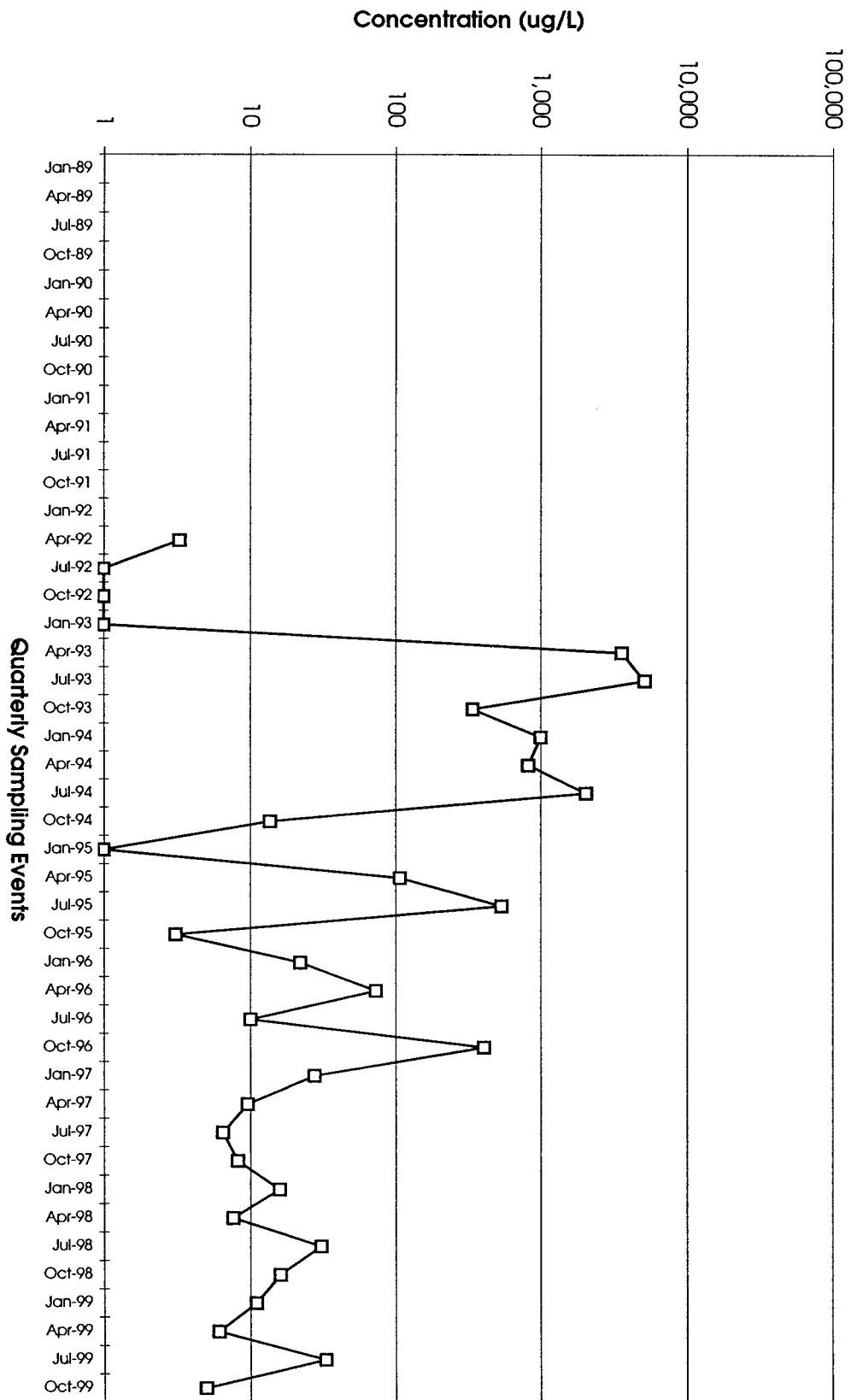
Phibro-Tech, Inc.
Total BTEX Concentrations
MW-14S



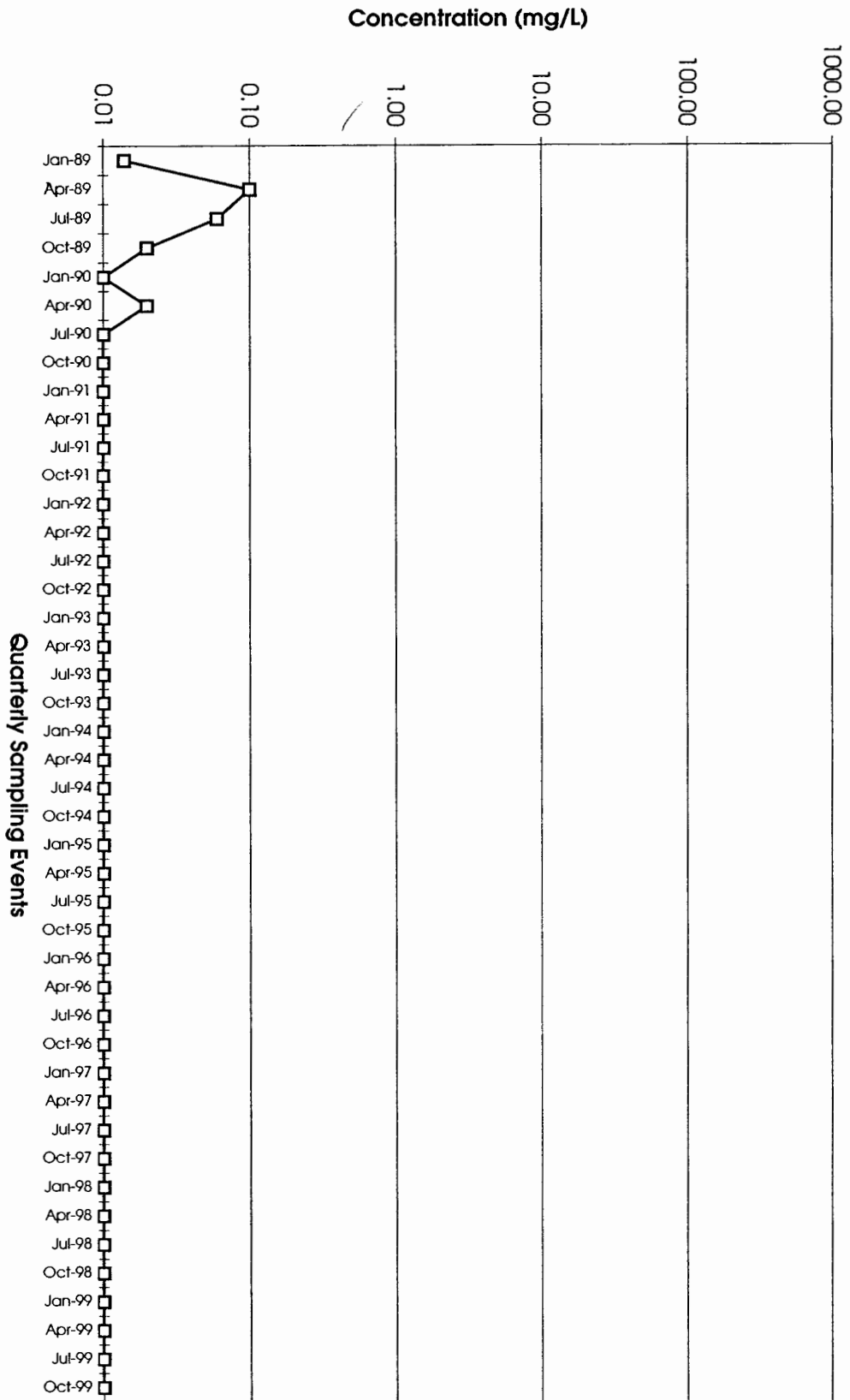
Phibro-Tech, Inc.
Total BTEX Concentrations
MW-15S



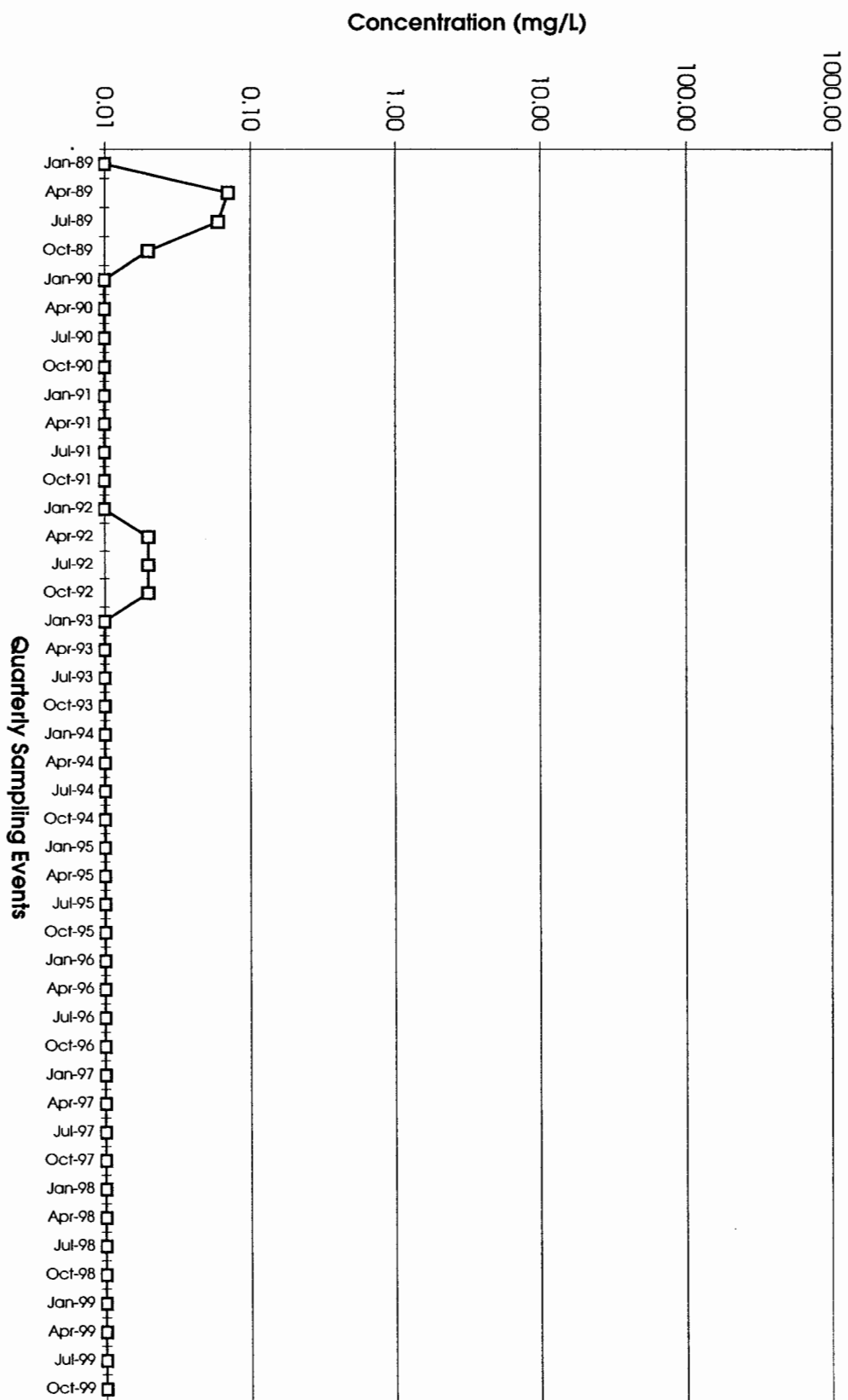
Phibro-Tech, Inc.
Total BTEX Concentrations
MW-16



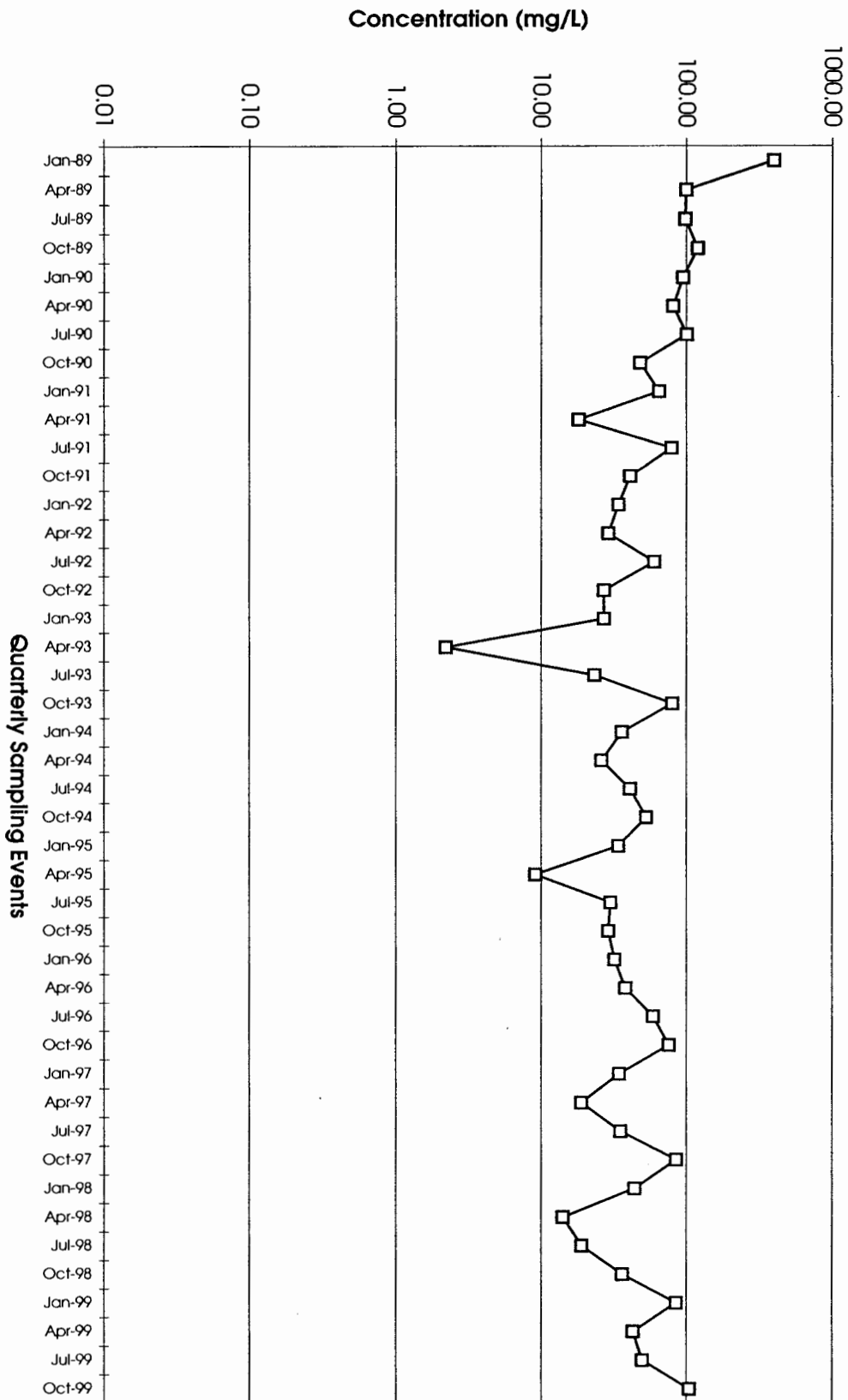
Philbro-Tech, Inc.
Total Chromium Concentrations
MW-01S



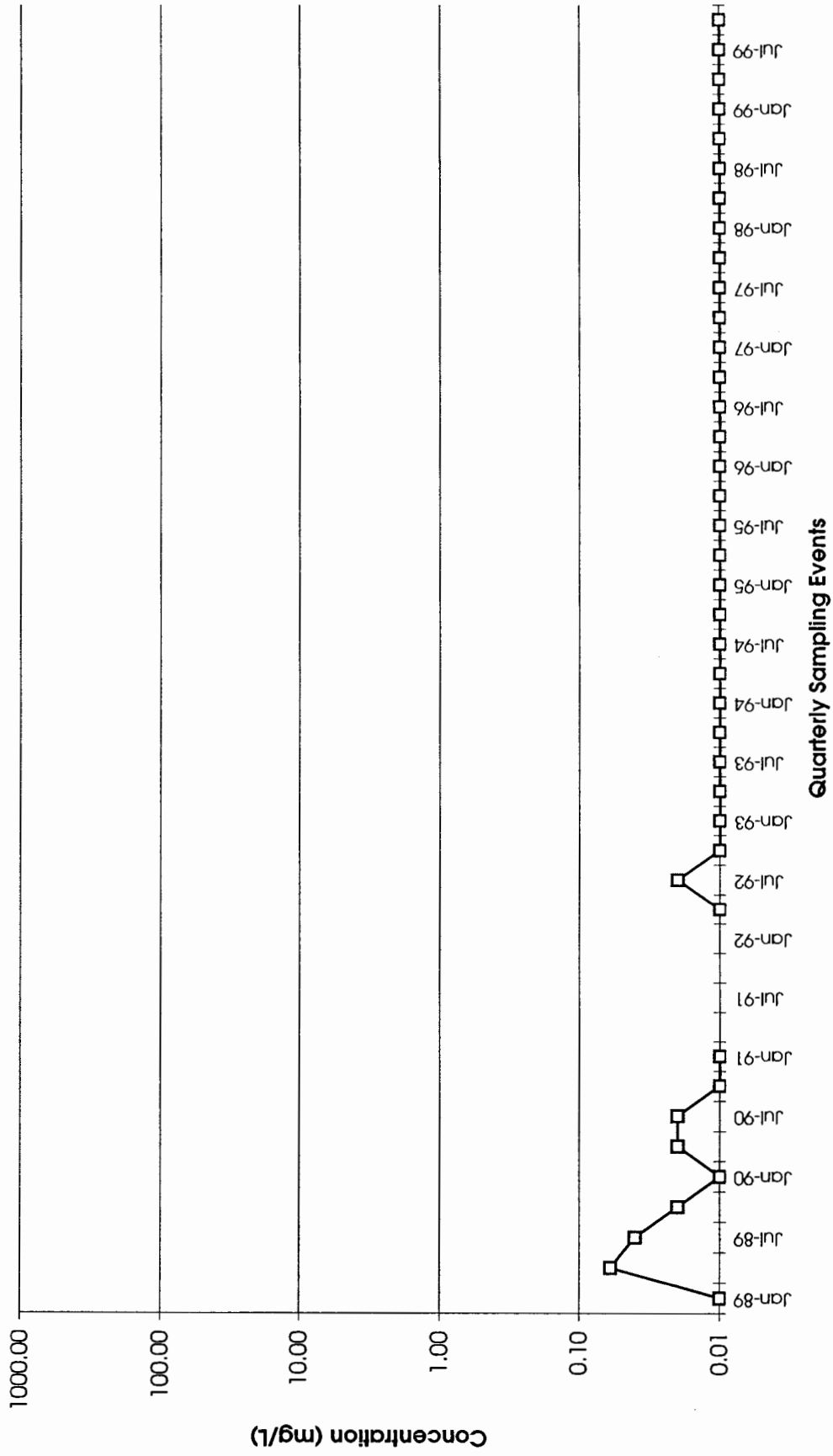
Phibro-Tech, Inc.
Total Chromium Concentrations
MW-03



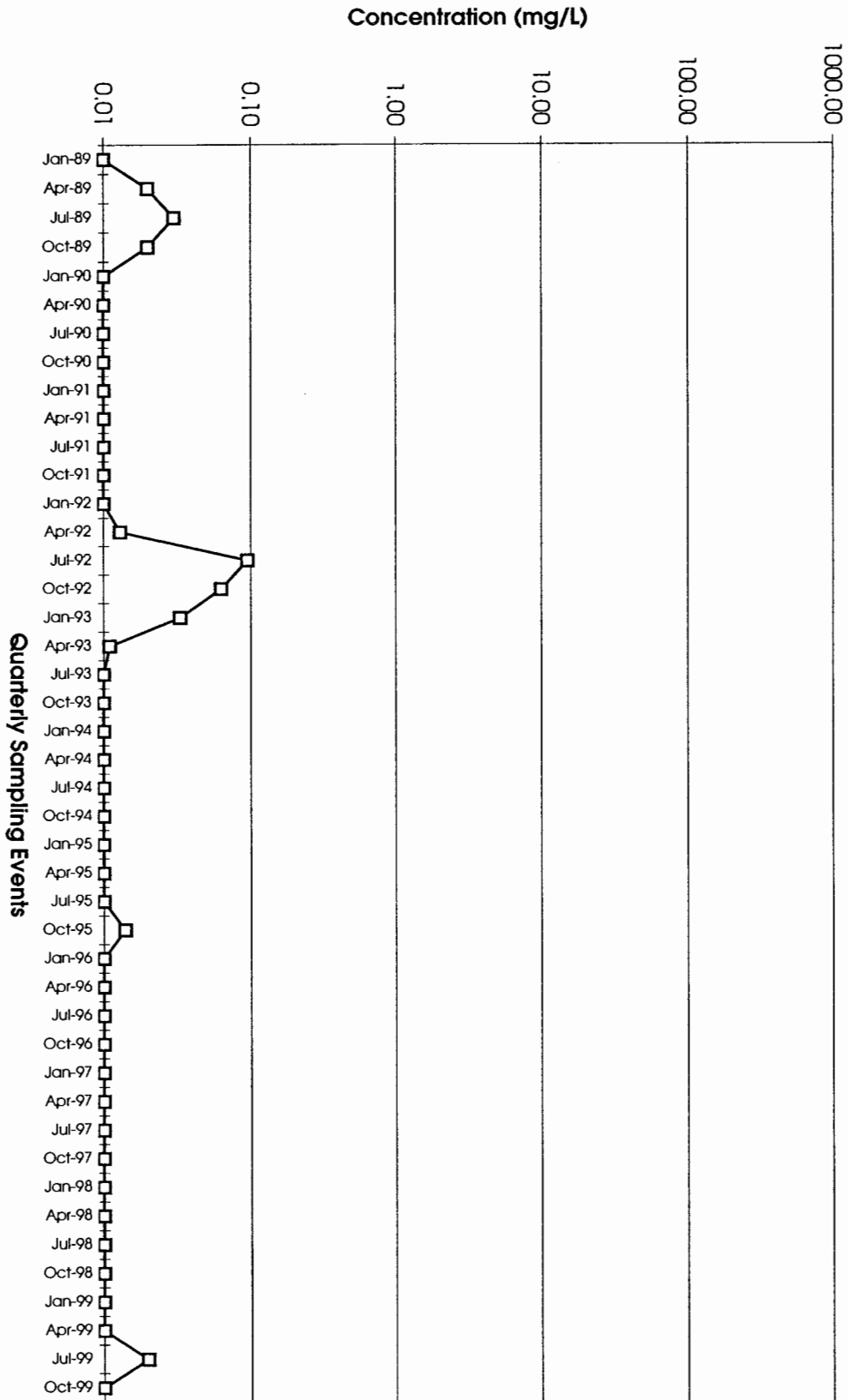
Phibro-Tech, Inc.
Total Chromium Concentrations
MW-04



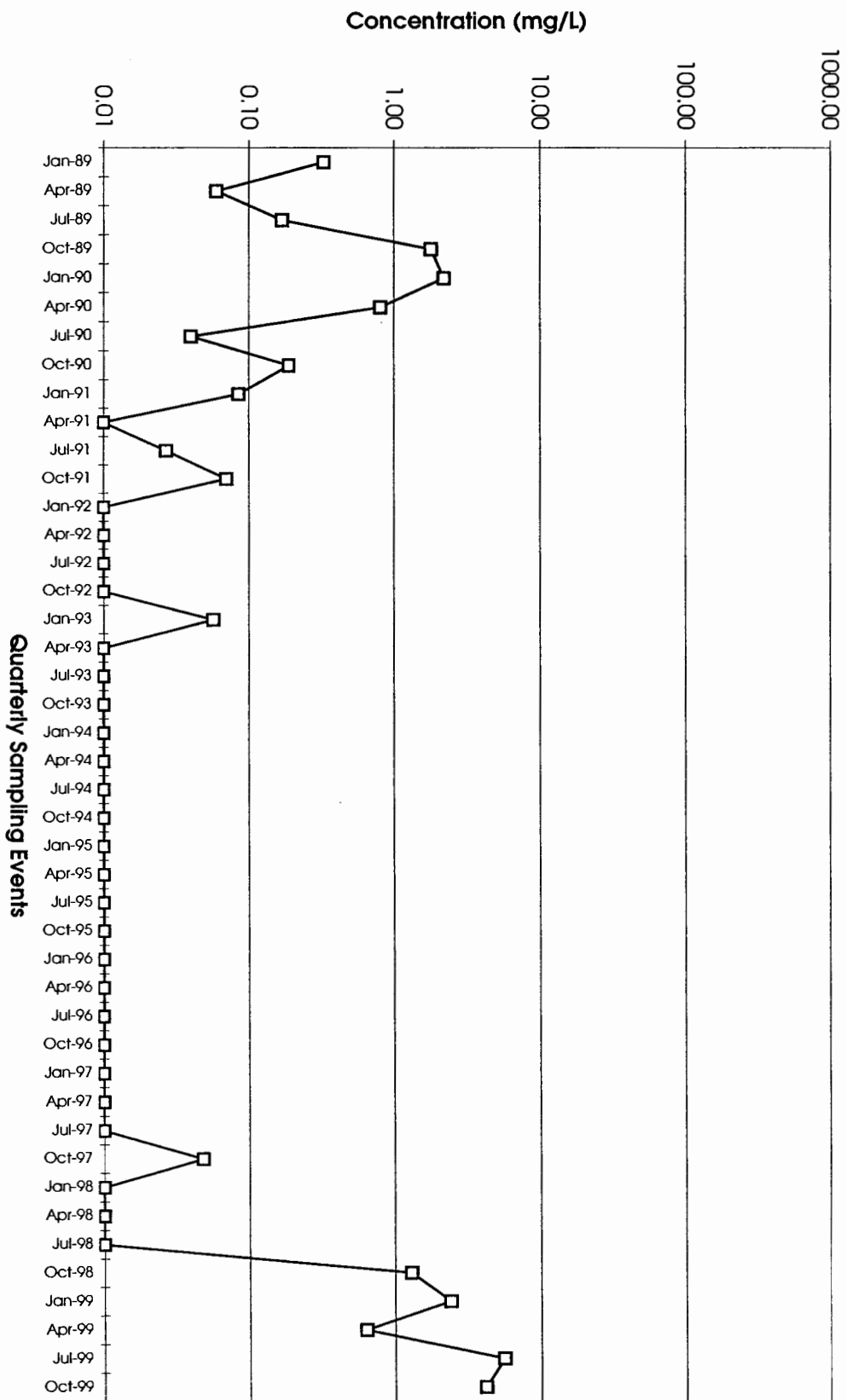
Phibro-Tech, Inc.
Total Chromium Concentrations
MW-06B



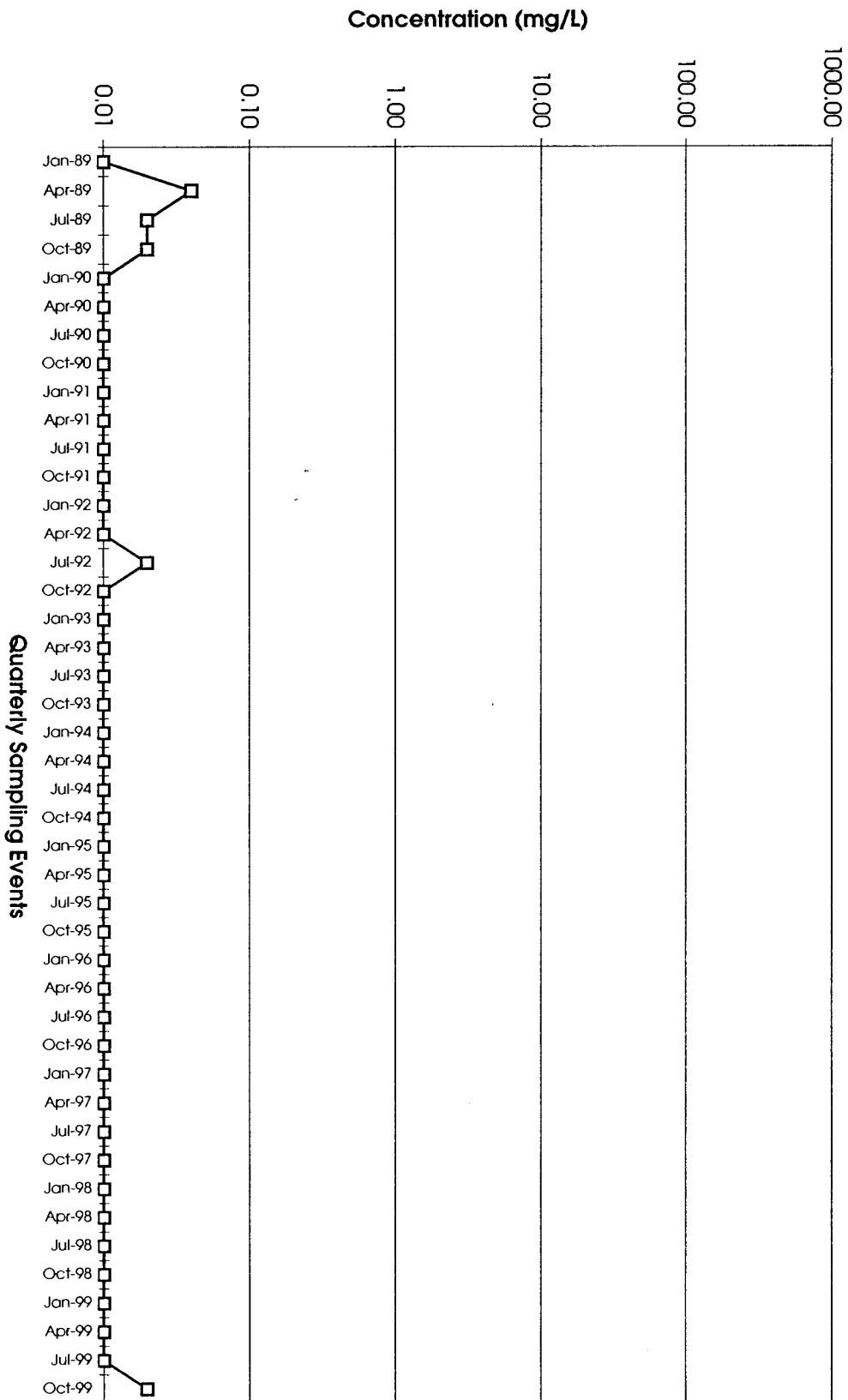
Phibro-Tech, Inc.
Total Chromium Concentrations
MW-07



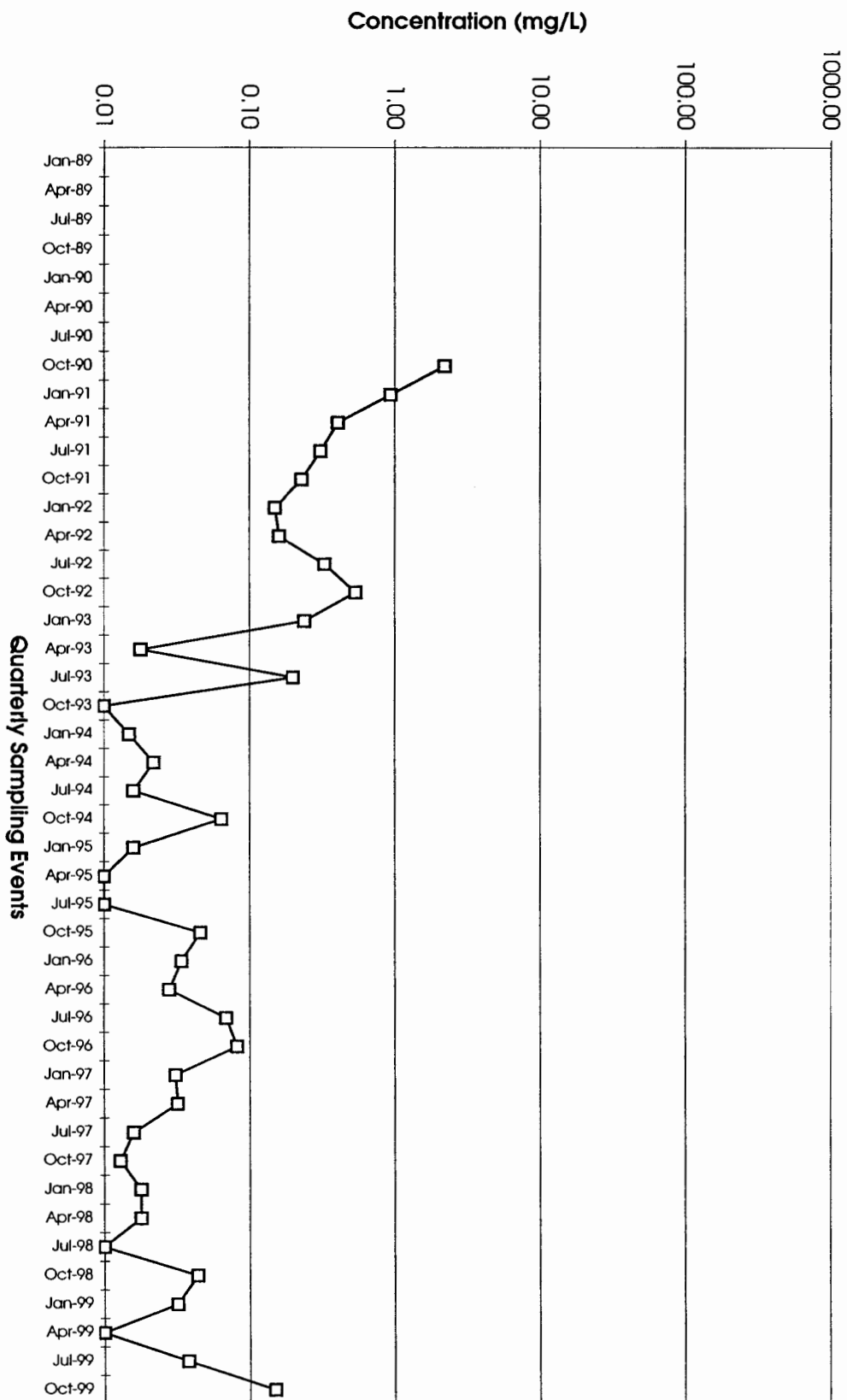
Phibro-Tech, Inc.
Total Chromium Concentrations
MW-09



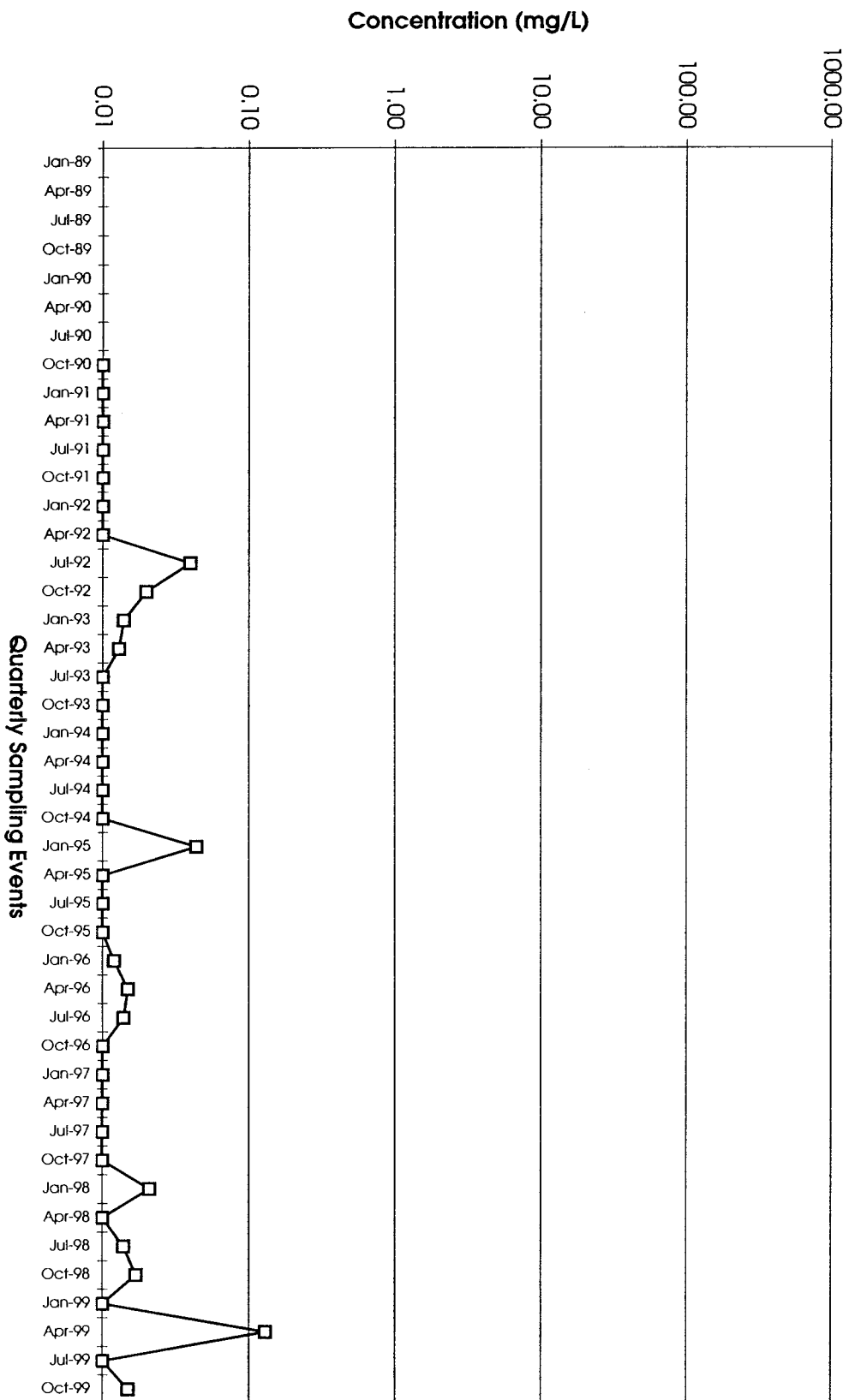
Phibro-Tech, Inc.
Total Chromium Concentrations
MW-11



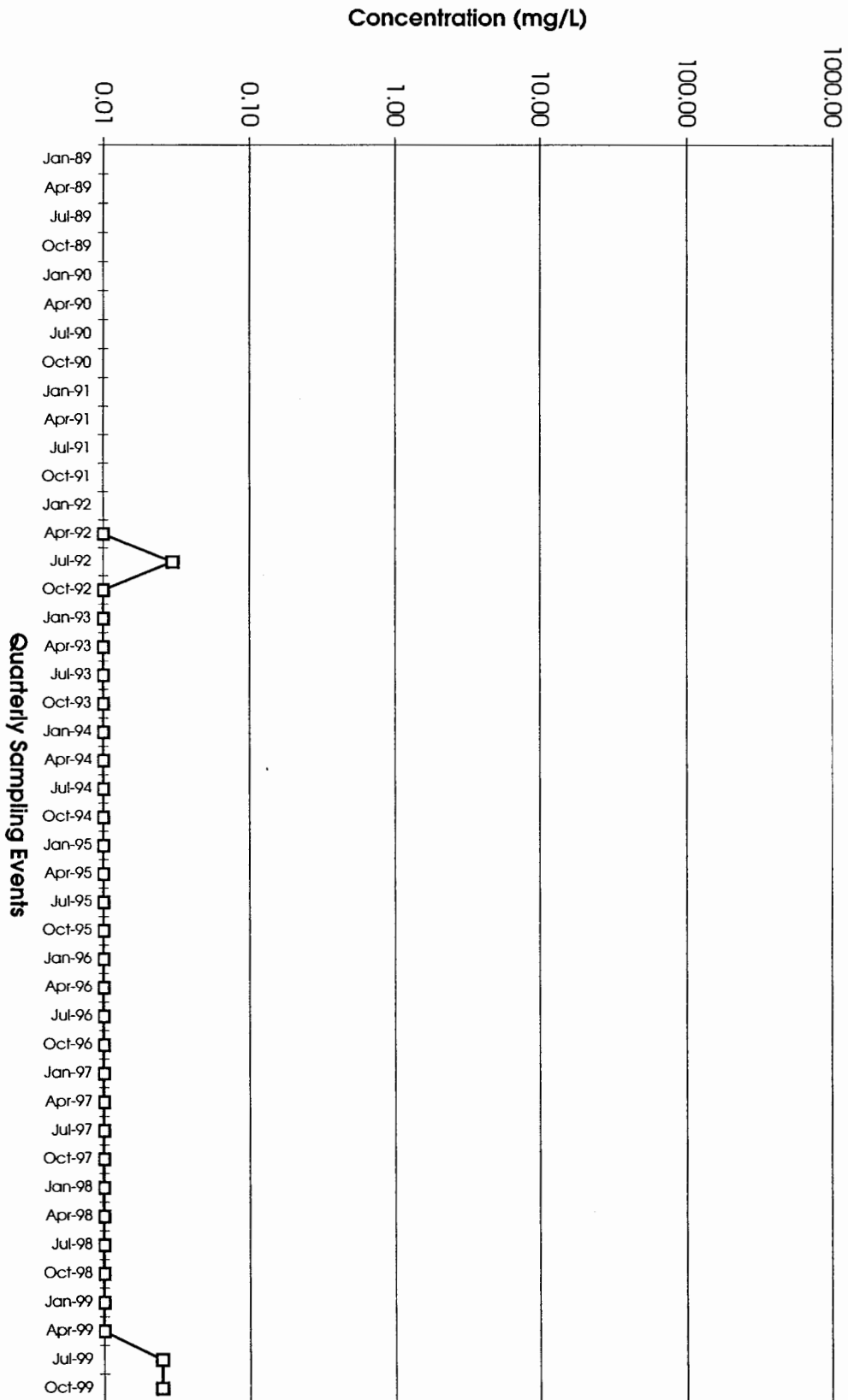
Phibro-Tech, Inc.
Total Chromium Concentrations
MW-14S



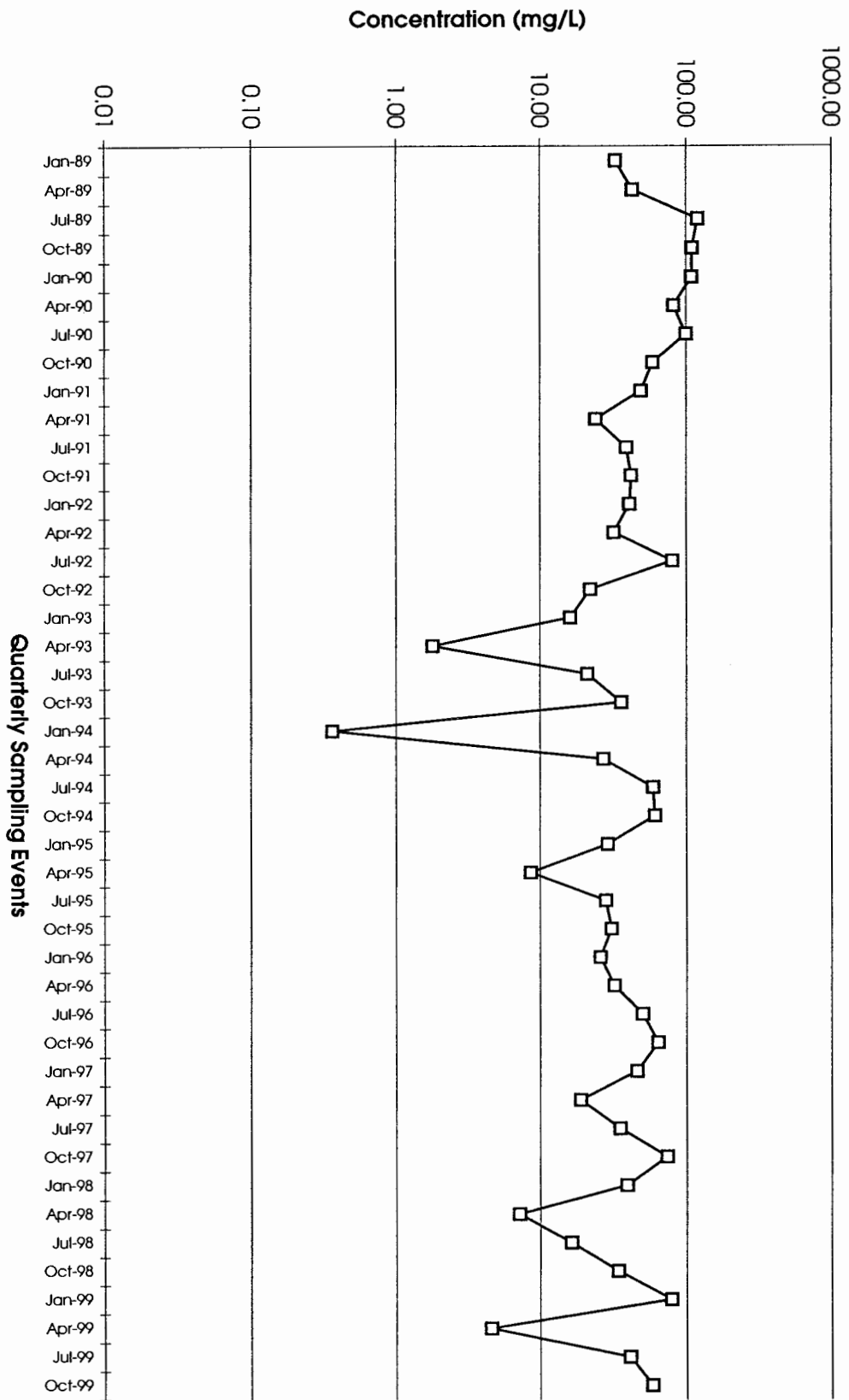
Phibro-Tech, Inc.
Total Chromium Concentrations
MW-15S



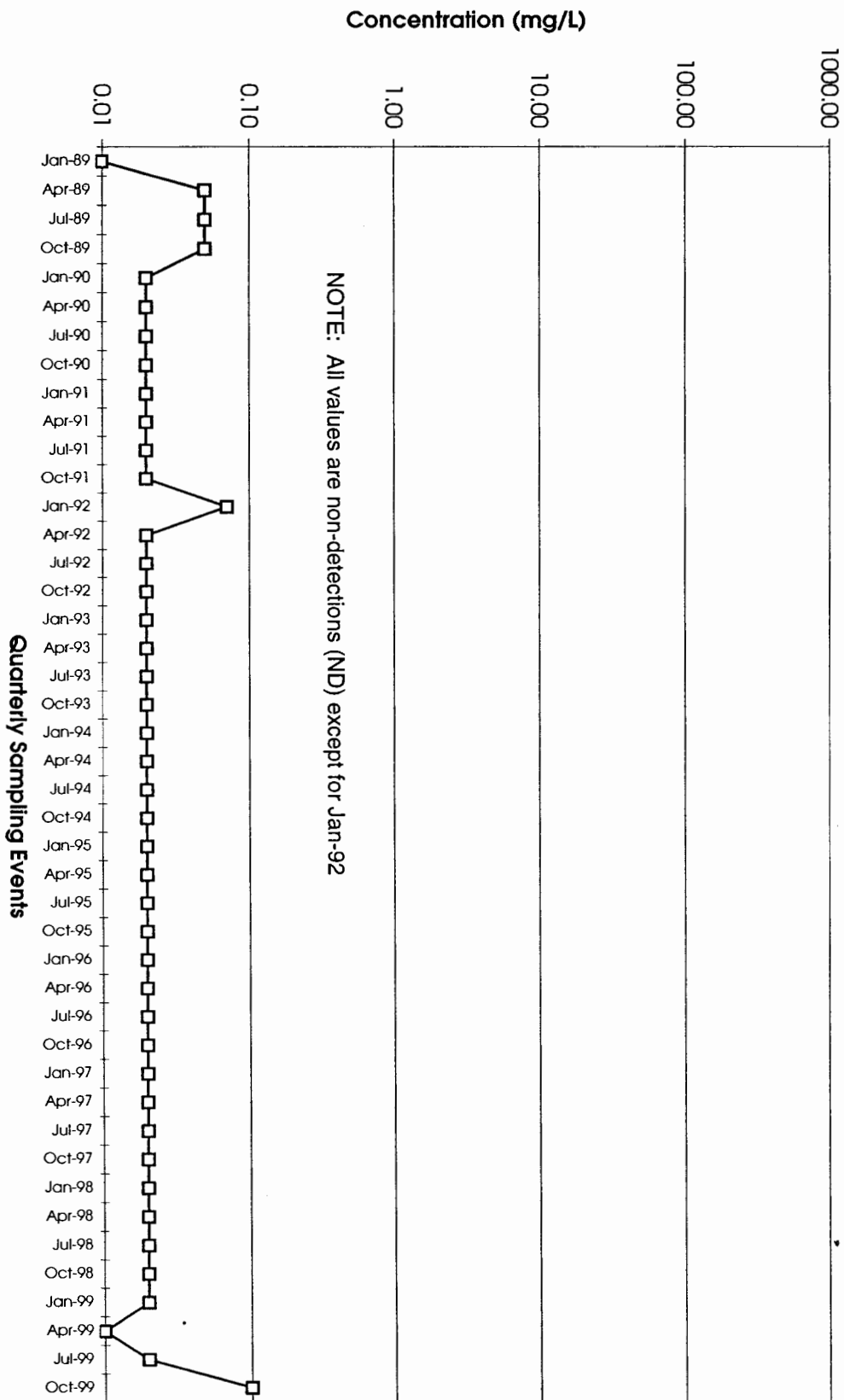
Phibro-Tech, Inc.
Total Chromium Concentrations
MW-16



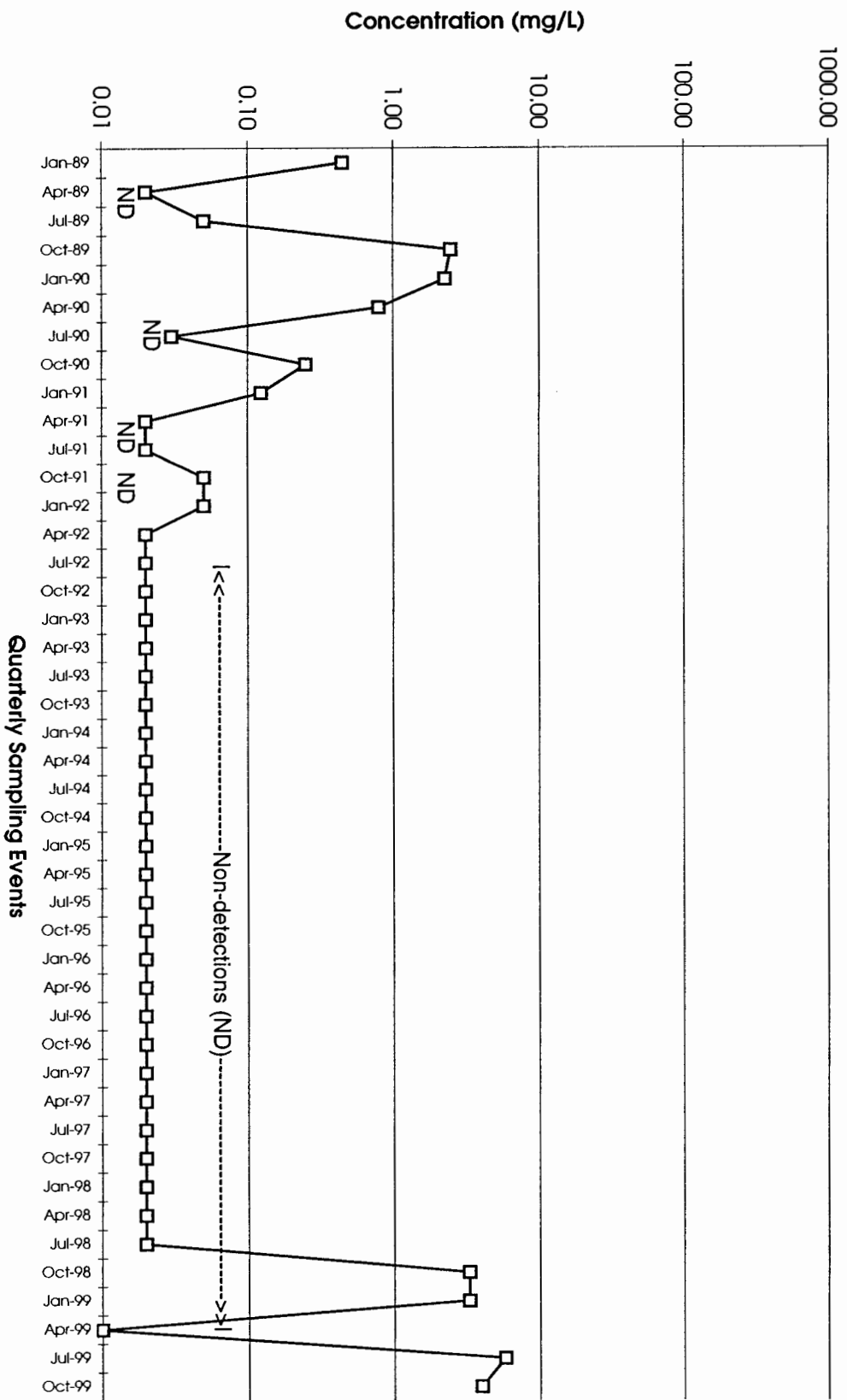
Phibro-Tech, Inc.
Hexavalent Chromium Concentrations
MW-04



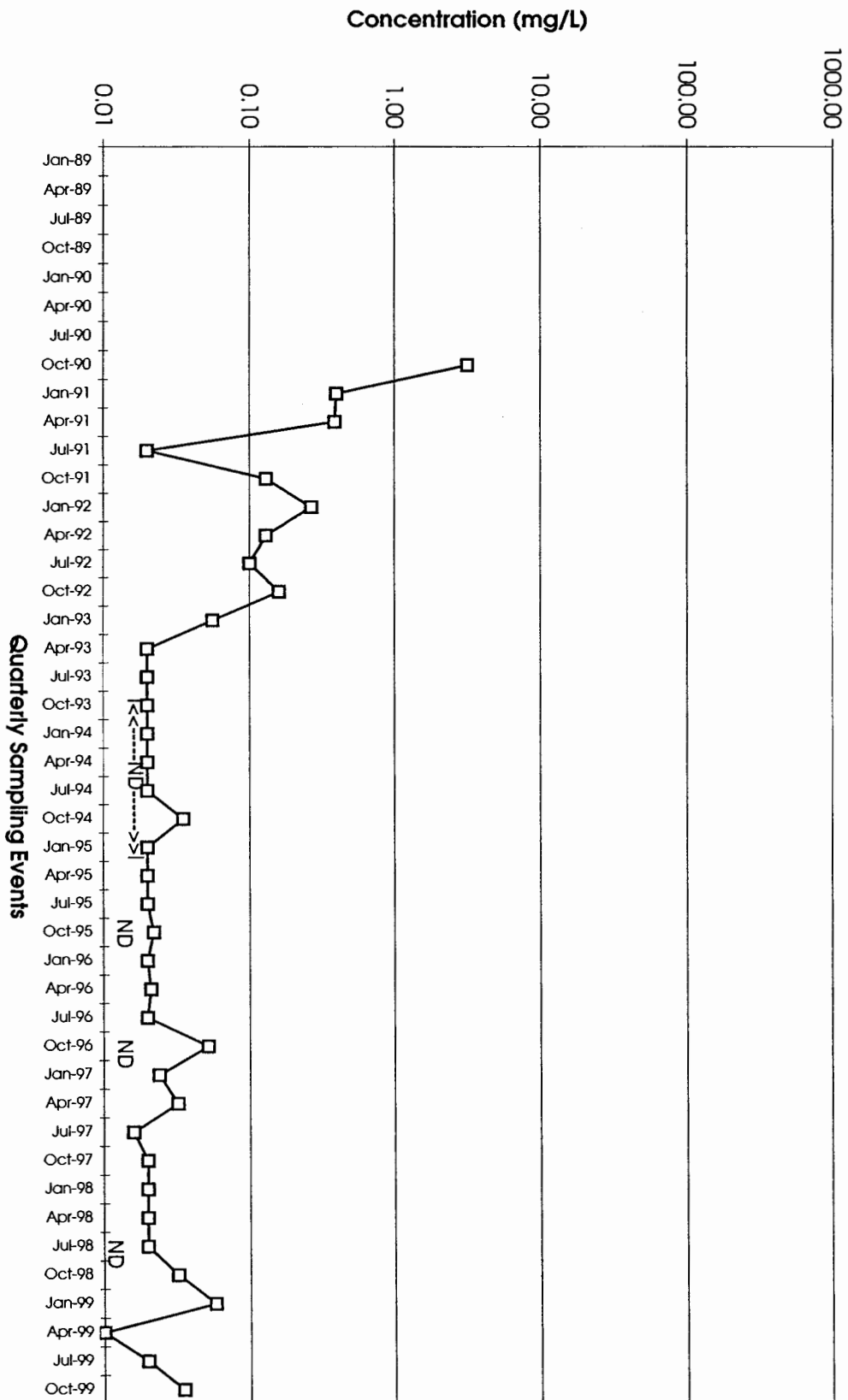
Phibro-Tech, Inc.
Hexavalent Chromium Concentrations
MW-07



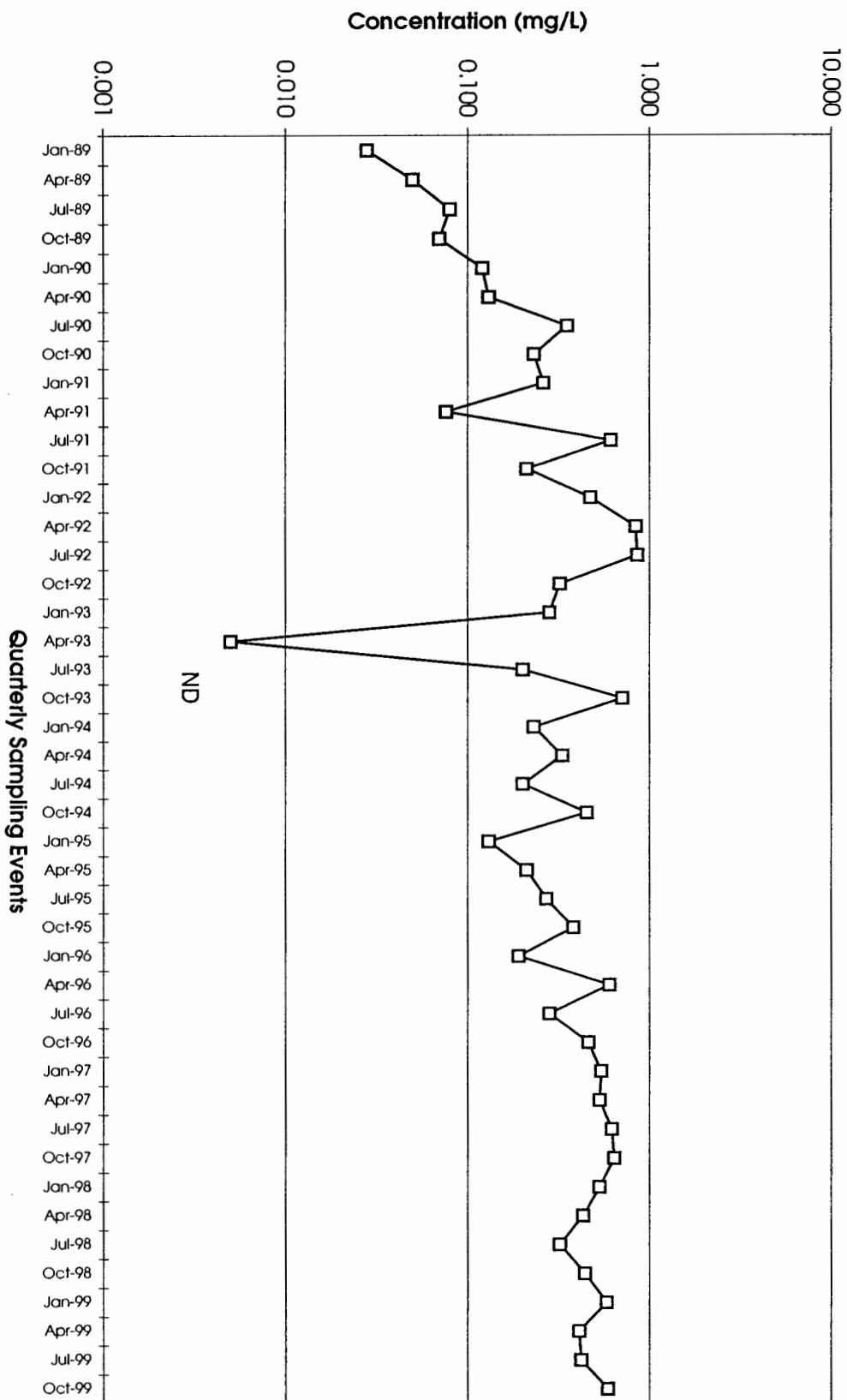
Phibro-Tech, Inc.
Hexavalent Chromium Concentrations
MW-09



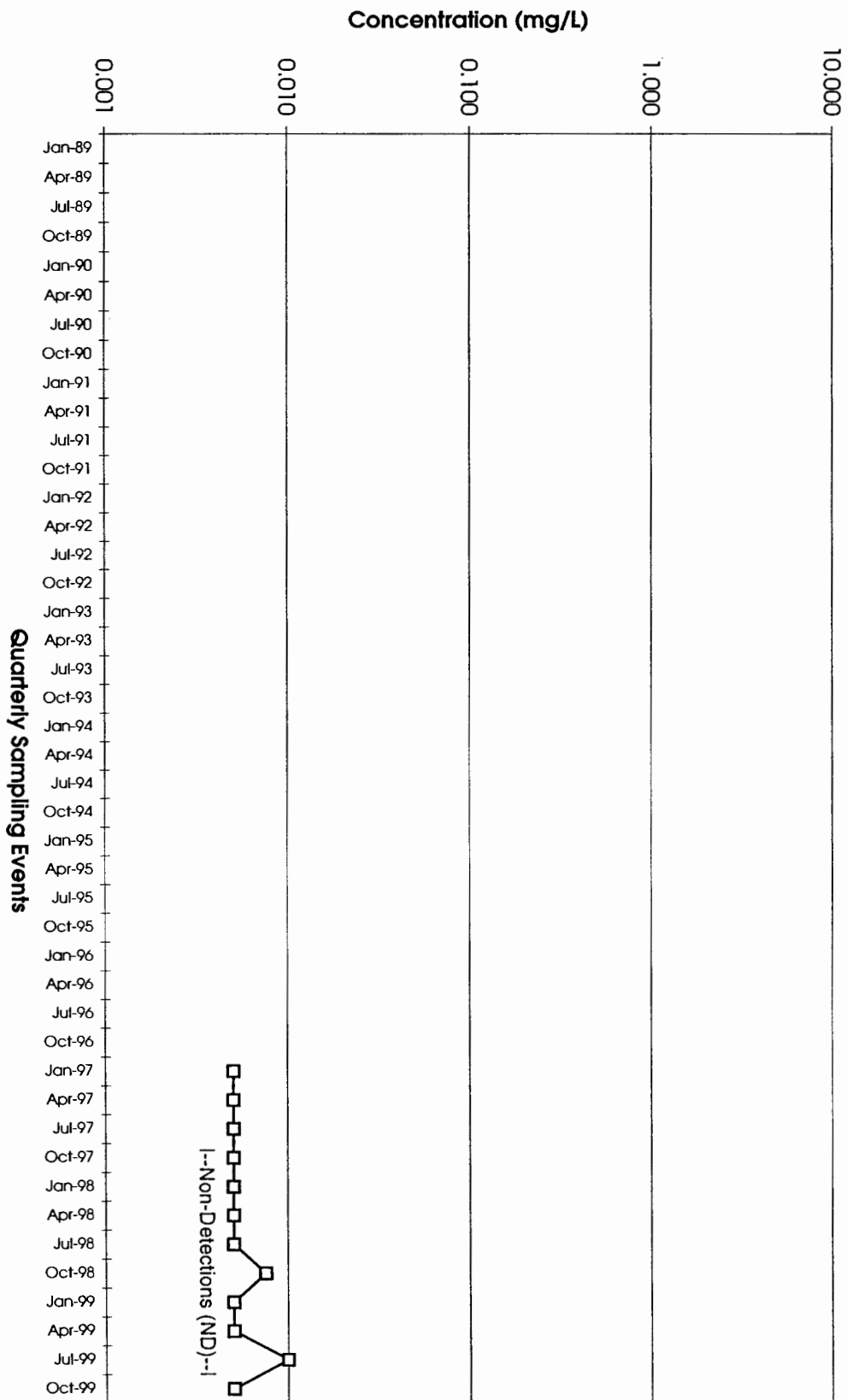
Phibro-Tech, Inc.
Hexavalent Chromium Concentrations
MW-14S



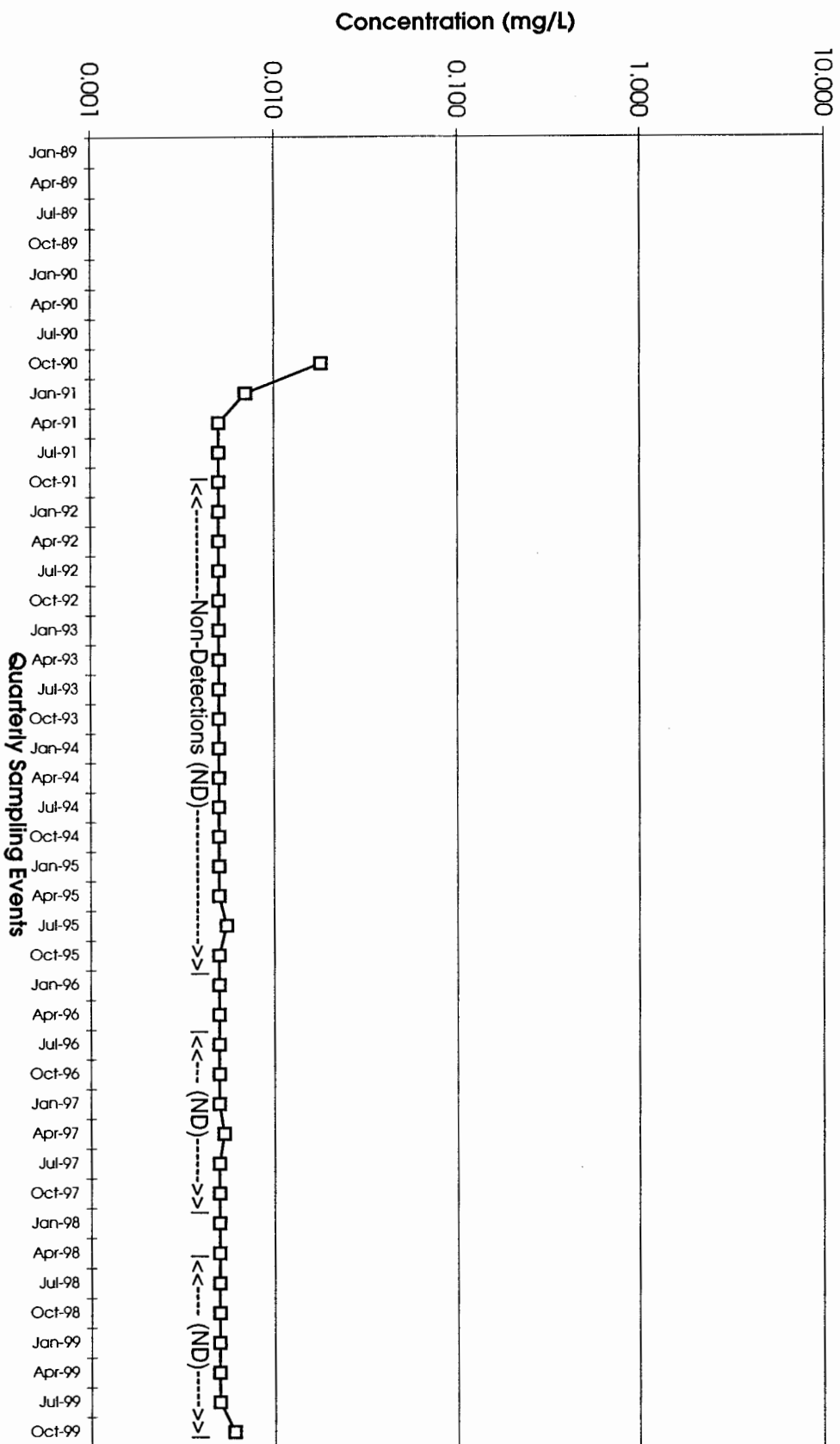
Phibro-Tech, Inc.
Cadmium Concentrations
MW-04



Phibro-Tech, Inc.
Cadmium Concentrations
MW-09



Phibro-Tech, Inc.
Cadmium Concentrations
MW-14S



Quarterly Sampling Events

ND ND

ND

<->|-----Non-Detections (ND)----->>|

Quarterly Sampling Events